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Totti Könnölä

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Joint Research Centre

Institute for Prospective Technological Studies

Contact information

Address: Edificio Expo. c/ Inca Garcilaso, 3. E-41092 Seville (Spain)

E-mail: jrc-ipts-secretariat@ec.europa.eu

Tel.: +34 954488318

Fax: +34 954488300

<https://ec.europa.eu/jrc>

<https://ec.europa.eu/jrc/en/institutes/ipts>

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Abstract

The Analytical Country Reports analyse and assess in a structured manner the evolution of the national policy research and innovation in the perspective of the wider EU strategy and goals, with a particular focus on the performance of the national research and innovation (R&I) system, their broader policy mix and governance. The 2013 edition of the Country Reports highlight national policy and system developments occurring since late 2012 and assess, through dedicated sections:

national progress in addressing Research and Innovation system challenges;

national progress in addressing the 5 ERA priorities;

the progress at Member State level towards achieving the Innovation Union;

the status and relevant features of Regional and/or National Research and Innovation Strategies on Smart Specialisation (RIS3);

as far relevant, country Specific Research and Innovation (R&I) Recommendations.

Detailed annexes in tabular form provide access to country information in a concise and synthetic manner.

The reports were originally produced in December 2013, focusing on policy developments occurring over the preceding twelve months.

ACKNOWLEDGMENTS AND FURTHER INFORMATION

This analytical country report is one of a series of annual ERAWATCH reports produced for EU Member States and Countries Associated to the Seventh Framework Programme for Research of the European Union (FP7). [ERAWATCH](#) is a joint initiative of the European Commission's [Directorate General for Research and Innovation](#) and [Joint Research Centre](#).

The Country Report 2013 builds on and updates the 2012 edition. The report identifies the structural challenges of the national research and innovation system and assesses the match between the national priorities and the structural challenges, highlighting the latest developments, their dynamics and impact in the overall national context.

The first draft of this report was produced in December 2013 and was focused on developments taking place in the previous twelve months. In particular, it has benefitted from the comments and suggestions of Nicholas Harrap and Marja Nissinen from JRC-IPTS. The contributions and comments from DG-RTD are also gratefully acknowledged.

The report is currently only published in electronic format and is available on the [ERAWATCH website](#). Comments on this report are welcome and should be addressed to jrc-ipts-erawatch-helpdesk@ec.europa.eu.

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EXECUTIVE SUMMARY

Finland is a sparsely inhabited country with 5.4 million inhabitants located in northern Europe. By land mass Finland is the 8th largest country on the continent. The Gross Domestic Product (GDP) at market prices of Finland was €189 billion in 2011 and GDP at market prices per capita was €35,200 thus being clearly above the EU-27 average (Eurostat, 2013).

Finland has one of the world's highest R&D intensities. The country also performs well in terms of scientific and technological excellence. The Finnish economy is knowledge-intensive, and has achieved a continuous change towards a stronger high and medium-high-tech specialisation. The country has several hot-spot clusters in key technologies on a European and world scale, in particular in ICT, environment, materials, energy, security, and food and agriculture.

[The Innovation Union Scoreboard 2013](#) positions Finland among other innovation leaders including Sweden, Germany and Denmark, which show a performance well above that of the EU average. The relative strengths of Finland are in Human resources and Finance and support. Relative weaknesses are in Open, excellent and attractive research systems. High growth is observed for Community trademarks, Knowledge-intensive services exports and License and patent revenues from abroad. Growth for Knowledge-intensive services was the highest off all Member States. A relatively strong decline is observed for Innovative SMEs collaborating with other SMEs. Growth performance in Intellectual assets and Innovators is well above average and in Firm investments and Linkages & entrepreneurship well below average.

In this report the main five challenges of the Finnish R&I system are defined as follows:

- Weak internationalisation of the research and innovation system
- The quality of scientific research
- The fragmentation of the higher education and the public research sector
- Further emphasis on supply side measures
- Concentration of private R&D to few sectors and businesses

The Government has initiated major structural and instrument specific changes to address these challenges. [The Finnish National Reform Programme \(2012\)](#) identified the most important substantive reforms of the research and innovation policy to be the creation and introduction of new means and models to strengthen innovation activity, the establishment of attractive clusters of expertise, internationalisation, structural development of higher education, reform of research institutes and research funding, and organisation of infrastructure policy and the tenure track system. Overall, the number and scale of reforms taking place signal the continuous commitment to a broad and ambitious R&I policy.

In Finland government support to research and innovation has mainly been channelled through direct funding, whereas indirect funding measures have emerged in the recent policy formulations. All in all, generic funding instruments are increasingly developed having in mind their application in strategically selected thematic areas and sectors. The Government has safeguarded an adequate level of research, development and innovation funding and clarified the division of responsibilities of actors that distribute public financing. In particular, the following measures have been taken forward in response to the commitment to the National 2020 R&D target of 4%/GDP: Research and development tax deduction and temporary growth; entrepreneurship incentive, reallocation of public research funding; a proposal for a reform of central government research institutions. However, GERD declined between 2009 and 2012 from 3.94% to 3.55%.

Finland's innovation policy and measures in general are geared towards speeding up the development, commercialisation and take-up of new technologies. Important reforms of the research and innovation policy entail various measures for the establishment of attractive clusters of expertise, internationalisation, structural development of higher education, reform of research institutes and research funding, and organisation of infrastructure policy and the tenure track system, in particular.

In addition to general efforts in enhancing the efficiency and improving the internationalisation of its innovation system, current and planned policy reforms are targeted at increasing the number of high growth innovative firms as the major source of future employment growth. The introduced temporary R&D tax incentive from 2013 to 2015 represents a novelty in Finland and targets SMEs and cooperatives. Furthermore, a new tax incentive for private investors in start-ups has been introduced to increase the volume of the domestic venture capital market. These actions are expected to support especially knowledge- and innovation-based young growth enterprises. The Finnish Government has also recently fostered innovation and the country's transfer to a digital service economy by releasing non-sensitive public data.

In 2012 the Government also introduced new measures that enhance especially through the INKA programme the role of the regions in implementing the national innovation strategy as growth platforms for innovations. A negotiating procedure and growth agreement preparations have been initiated for the creation of appealing innovation clusters. This will promote cooperation and coordinate the use of resources between key actors in the metropolitan regions and central government (see also earlier this section). Regional Innovation Scoreboard 2012 accompanied by the "[Regional Innovation Scoreboard 2012 Methodology report](#)" covers four Finnish regions: Itä-Suomi (FI13), Etelä-Suomi (FI18), Länsi-Suomi (FI19), Pohjois-Suomi (FI1A), Åland (FI2).

Finland has generally taken an active role in participating in the ERA. The European dimension is seen as a natural extension of the national policy for a small country with limited resources. In the report setting [the research and innovation policy guidelines for 2011-2015](#), the Research and Innovation Council stated that "Finland is a proactive and influential partner in the EU and in the initiatives of the European research and innovation policy, such as in deepening cooperation within national R&D programmes and promoting top-level European research".

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1 BASIC CHARACTERISATION OF THE RESEARCH AND INNOVATION SYSTEM

Finland is a sparsely inhabited country with 5.4 million inhabitants located in northern Europe. By land mass Finland is the 8th largest country on the continent. The Gross Domestic Product (GDP) at market prices of Finland was €189 billion in 2011 and GDP at market prices per capita was €35,200 thus being clearly above the EU-27 average (Eurostat, 2013).

Finland has one of the world's highest R&D intensities. The country also performs well in terms of scientific and technological excellence. The Finnish economy is knowledge-intensive, and has achieved a continuous change towards a stronger high and medium-high-tech specialisation. The country has several hot-spot clusters in key technologies on a European and world scale, in particular in ICT, environment, materials, energy, security, and food and agriculture.

Although the R&D expenditure grew, its share of GDP continued declining in 2012 to 3.55% compared to 3.94% in 2009. In Finland the private sector share of R&D funding is high with around 63% of GERD despite recent decline (Eurostat, 2014). In terms of research inputs, measured by human resources in science and technology as a share of labour force (50.7% in 2009), Finland ranks well compared to the EU-27 average (40.1%) and is on the same level with other innovation leaders (European Commission, 2012).

Overall, the Finnish governance system is a strong mix of national and local administration allowing regions to have a relatively high degree of autonomy in the design and implementation of regional policies. Innovation policies and strategies, however, are guided and directed by the Finnish government, which decides on national development goals and lays down the general guidelines for regional innovation policy (Viljamaa & Lahtinen, 2011).

1.1 Governance of the Finnish research system

As illustrated in the figure below, the Finnish research and innovation system is divided into four operational levels. **The Finnish Parliament and the National government rule the highest level.** In matters related to research, technology and innovation policy, the latter is supported by a high-level advisory body, [the Research and Innovation Council](#) (RIC; formerly Science and Technology Policy Council of Finland). The RIC is responsible for the strategic development and coordination of Finnish research and innovation policies and is led by the Prime Minister.

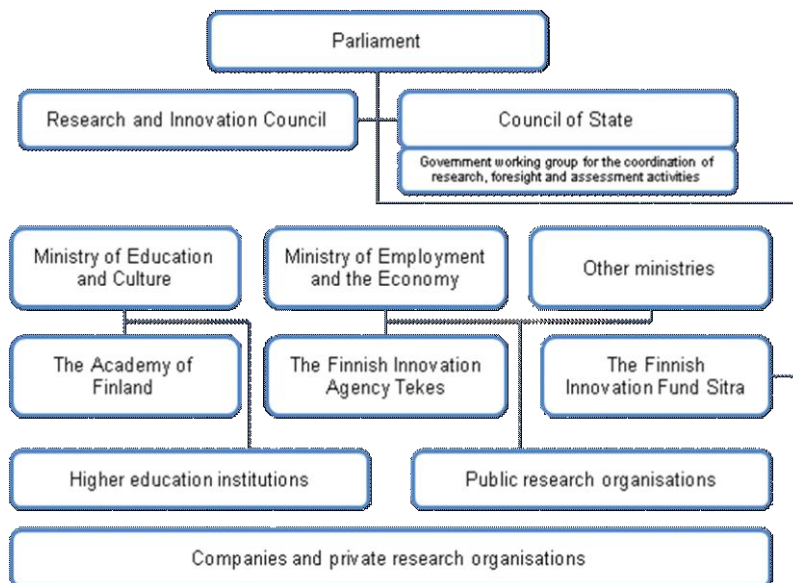
The second level consists of the ministries, of which [the Ministry of Education and Culture](#) (MEC) and [the Ministry of Employment and the Economy](#) (MEE) play the key role with respect to research and innovation policy. MEE was reorganised in September 2011 and is responsible for innovation policy planning and budgeting. MEC is responsible for higher education and science policy related matters. Together these ministries account for over 80% of the government research and innovation funding with the MEC having around 45% of all funding and MEE around 36% of funding in 2011. The share of MEC has increased during recent years mainly due to additional funding to universities and the Academy of Finland.

The R&D funding agencies, [the Academy of Finland](#) and [Tekes, the Finnish Funding Agency for Technology and Innovation](#), form the third level. The former funds basic research through competitive grants (in 2012 it made funding decisions for a value of around EUR €327m) and the latter allocates the majority of its funds to R&D projects carried out by businesses. Tekes is also a large financier of research at the universities and public research institutes. In 2013 Tekes funding decisions is budgeted to amount to € 542m, 4.8% less than in 2012 (Statistics Finland, 2013).

Other important instruments are the R&D programmes by Tekes (such as the new programmes “[Growth from Renewables 2010–2014](#)”, “[Green Growth 2011-2015](#)”, and “[Green Mining 2011-2016](#)” launched in 2010 and 2011), the Academy of Finland and various ministries. Additionally, the MEE has published an action plan for measures to support demand-led and user-driven innovation policy and the Academy of Finland has also published a [strategy](#) for research programmes.

The fourth level is comprised of the organisations that conduct research: universities (16), public research organisations (18), private research organisations and businesses. Due to the high number of universities, polytechnics and government research institutes the Finnish research system is rather decentralised. The biggest state research organisation is Technical Research Centre (VTT) with an annual budget of approximately €290m. The reform of the central government's sectorial research institutes strengthens multidisciplinary research and to support large research projects.

Figure 1: Overview of the Finland’s research system governance structure



Source: Research.fi, revised by the authors

2 RECENT DEVELOPMENTS OF THE RESEARCH AND INNOVATION POLICY AND SYSTEM

2.1 National economic and political context

Finland's GDP declined slightly by -0.2% in 2012. Slow growth is expected for 2013 and 2014, with exports only gradually picking up. Sensitivity to the global environment is connected to the export structure; 80 % of exports consist of capital goods and intermediate goods for which demand is typically more volatile and influenced by the business cycle.

The Finnish economy faces strong headwinds from the ageing population. The working-age population has started to shrink. Productivity and living standards rank high among the developed countries, but erstwhile strong industries such as electronics and forestry are in difficulty and, in general, the share of manufacturing in GDP is declining. Although Finnish labour productivity has traditionally been high in manufacturing, this is less the case in the services sector.

Fiscal consolidation is on-going and the government has proclaimed the reduction of the debt ratio by 2015 as one of its most important goals. According to [Finland's stability programme](#), Finland's GDP is projected to grow by 0.4 per cent in 2013. In August 2013, Finland's government said its budget deficit in that year would be €9.0b, higher than a previously estimated €7.8b, as economic uncertainty had discouraged spending by companies and consumers. In light of fiscal measures decided in 2012 that took effect in 2013, public net borrowing is expected to be on a declining path in 2013 and 2014.

In December 2012, the government [action plan for research and innovation policy](#) described the operating environment of Finnish society, economy and research undergoing a rapid change: “International cooperation and competition have intensified, and uncertainties in the global economy have functioned to weaken our expectations for the future. The business sector is currently undergoing severe structural change. Responding to requirements related to the maintenance of the welfare society and sustainable development as well as the need for structural change within society and the economy constitutes the central framework for the research and innovation policy of the present government term.”

The research and development community has been heavily affected by the hardships faced by Nokia and its subcontractors, and by the downturns of the paper and pulp industry. The drop in orders from the industry, in turn, have led to dismissals at VTT Technical Research Centre of Finland, for instance. In fact, VTT reduced its personnel first time already around 2003–2005. Accordingly, MTT Agrifood Research Finland and Finpro, which is also reckoned as part of the innovation system (e.g. contribution to foresight and education exports, among others) dismissed people in 2013. While the research and innovation system is facing major structural pressures, the expectations on its potential to revive the economy remain high.

2.2 Funding trends

2.2.1 Funding flows

The recent Europe 2020 target for Finland is to have 4 % expenditure to R&D as a proportion of GDP by 2020. However, GERD declined between 2009 and 2012 from 3.94% to 3.55%.

In Finland the private sector share of R&D funding decreased from 67% of 2011 to 63% of GERD in 2012 (Eurostat, 2013). Respectively, the share of the government increased from 25% to 27% of GERD in 2012. Also the share of funding from abroad increased from 7% to 9% of GERD.

The government funds around 27% of all R&D activity. From this amount 65% is directed to the higher education sector, around 26% goes to public research organisations (mainly sectorial research institutes) and approximately 8% to the private sector. Most of the university funding comes from various government sources, especially from the Ministry of Education and Culture but also from the main public R&D funders, the Academy of Finland and Tekes.

Although private sector participates in the funding of the research carried out by the higher education and public sector, most of their funding goes to private R&D. Public research organisations perform about 9 % and the higher education around 22 % of all R&D activities. In 2012 61% of funding from abroad was directed to the private sector. Around 24% of the foreign funding went to universities and 12% to the public research organisations. Funding to basic research and research infrastructures has grown more slowly than funding to applied research and innovation. Recent budgetary cuts have further exacerbated this trend.

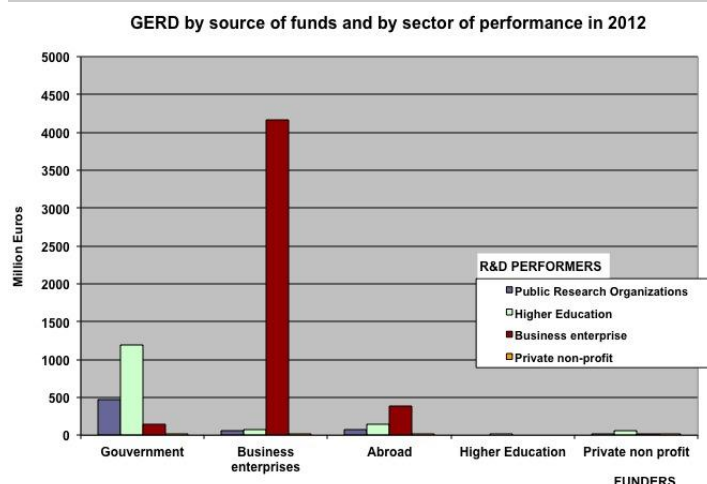
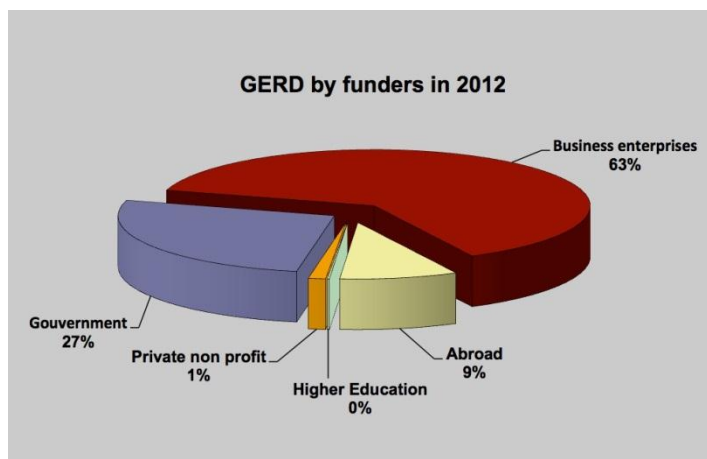


Table 1. Basic indicators for R&D investments

	2009	2010	2011	2012	EU (2012)*
GDP growth rate	-8.2	3.4	2.7	-0.8	-0.4
GERD (% of GDP)	3.94	3.9	3.8	3.55	2.06 e
GERD (euro per capita)	1274.1	1302.7	1332.7	1264.9	525.8 e
GBAORD - Total R&D appropriations (€ million)	1,893.689	2,012.672	2,018.948	2,001.654 p	86,309.497 e
R&D funded by Business Enterprise Sector (% of GDP)	2.68	2.58	2.54	2.24	1.12 (2011 e)
R&D performed by HEIs (% of GERD)	19	20	20	22	24
R&D performed by Government Sector (% of GERD)	9	9	9	9	12
R&D performed by Business Enterprise Sector (% of GERD)	71	70	70	69	63
Share of competitive vs. institutional public funding for R&D	-	-	-	-	-
Venture Capital as % of GDP (<i>Eurostat table code tin00141</i>)	0.050	0.055	0.041	0.041	0.025
Employment in high- and medium-high-technology manufacturing sectors as share of total employment (<i>Eurostat table code tin00141</i>)	5.5	5.7	5.2	5.2	5.6 (2011)
Employment in knowledge-intensive service sectors as share of total employment (<i>Eurostat table code tsc00012</i>)	43.0	42.2	43.2	45.0	38.9 (2011)

	2004	2006	2008		EU (2008)
Turnover from Innovation as % of total turnover (<i>Eurostat table code tsdec340</i>)	14.9	15.7	15.6		13.3

* The EU27 (or 28 as far available)

e estimated

p provisional

2.2.2. Funding mechanisms

2.2.2.1 Competitive vs. institutional public funding

Table 2 details the Government budget appropriation or outlays for R&D in 2014. 42,8% in is allocated in Tekes and Academy of Finland, which both operate within a competitive funding framework. Also other R&D funding of 11,6% entail also competitive funding practices of ministries and agencies. Furthermore, the recent reforms of the R&I system has moved institutional funding to be decided in more competitive basis and some recent changes and indicate further budget shifts from government research institutes to the Academy of Finland.

Table 2. Government budget appropriations or outlays for R&D (GBAORD) in 2014

	R&D funding € million	Share of R&D funding, %	Real change from 2013, %
Universities	578,9	29.6	-0,7
Tekes	513,3	26.3	-6,8
Academy of Finland	322,7	16.5	-3,6
Government research institutes	282,2	14.4	-7,2
Other R&D funding	226,7	11.6	1,0
University central hospitals	31,3	1.6	-0,6

Ref. Official Statistics of Finland (OSF): Government R&D funding in the state budget [e-publication]. 2014. Helsinki: Statistics Finland [referred: 12.4.2014]. http://tilastokeskus.fi/til/tkker/2014/tkker_2014_2014-02-20_tie_001_en.html.

With regard to the practices determining the core funding, Research and Innovation Policy Guidelines for 2011–2015 states that the independence and international scope of evaluations are strengthened. The independence of evaluations is strengthened with respect to the subject of the evaluation. Evaluations are international in scope. Evaluation results are more closely linked to the development and decision-making of organisations and functions.

In 2012, the Government approved the decrees related to **the revision of university funding model**. Government appropriations will be directed especially on the basis of completed qualifications and credits as well as scientific publications and competed research funding. Funding of universities of applied sciences will be revised to better support educational targets, such as improvement of the quality of teaching and research.

In September 2013 the Finnish Government approved resolution that specifies a package of measures for [the reform of research institutes and research funding](#). Through the funding reform, research and analysis work in support of decision-making by the government and its ministries will be strengthened by gathering together research funding for deployment in line with government policy.

Research and analysis activities supporting societal decision-making by the Government will also be strengthened, by accumulating funding in stages from state research institutes' budget-funded research appropriations and placing it at the disposal of the government and its ministries. This will be accomplished between 2014–2016, making available EUR 5 million in 2014, EUR 7.5 million in 2015, and EUR 12.5 million in 2016 in non-earmarked funds, for research, assessment and analysis activities meeting the immediate information needs of the Government and its ministries. To be placed at the general disposal of the Government, such funds will be allocated to common and horizontal projects and research and analysis projects supporting decision-making within the ministries' administrative branches. Projects will be designed and coordinated through a plan for research in support of Government decision-making. **A joint-research commissioning group**, under the leadership of the Prime Minister's Office, will be in charge of preparing this plan.

Project-based funding by the Academy of Finland is allocated on a competitive basis and in line with the principles of peer review. The new overall reform of research funding will also affect the activities of the Academy of Finland. Through the reform, some 22 per cent of direct government budget-funded research appropriations will be assembled and subjected to competition. The objective is to make EUR 70 million available for strategic research funding in 2017. Such funding will be assembled in stages between 2015–2017, from the state research institutes' research appropriations (EUR 52.5 million), from the Academy of Finland's research funding (EUR 7.5 million) and from the Finnish Funding Agency for Technology and Innovation Tekes' innovation funding (EUR 10 million). **The Strategic Research Council**, which will manage these funds, will be based at the Academy of Finland. The council will fund

long-term projects. Its decisions will be based on a review of both scientific quality and societal relevance. Research funding subject to competition, and disbursed in support of social policy and society's functions and services, will be assembled under this instrument in order to make 70 million euros available for strategic research funding in 2017. Funding for applied R&D is also provided through **calls for proposals by Tekes**.

[“State and Quality of Scientific Research in Finland 2012”](#) states that in 2009 in the higher education sector in Finland, the proportion of core budget funding was just 46% (€594m). The most important other sources of funding are public funding organisations, which accounted for 34% (€439m). The most significant sources of public funding are the Academy of Finland and Tekes.

With regard to institutional funding, the on-going reform of the funding formula for universities and polytechnics aims at increasing the performance of Higher Education Institutions (HEIs) and addressing the fragmentation problem. The reform introduces more competition in the way institutional funding is allocated, since the research performance of the university is a component in the funding formula. Another on-going structural reform targets public research institutions. It is deemed that public research institutions' funding could be more competitive.

The relatively high share of competitive public funding is meant to improve the system performance but may also lead to extensive administration. In general, estimations on the impact of the shift from core to competitive project-based funding on researchers' working conditions are not possible for the time being.

2.2.2.2 Government direct vs indirect R&D funding¹

In Finland government support to research and innovation has mainly been channelled through direct funding, where as indirect funding measures have emerged in the recent policy formulations. [The Government budget for 2013](#) includes two tax incentives aimed at growth seeking businesses. **The Tax Incentive for Private Investors** targets business angels investing equity in SMEs. The incentive provides a possibility to postpone paying capital gains taxes as long as those gains are re-invested in qualifying businesses. **The R&D Tax Credit for SMEs** is a deduction from corporate income taxes tied to the wage costs of R&D personnel in Finland. This incentive is estimated to have a fiscal cost of up 200 million euros in the first year of operation. Presumably the R&D tax incentive measures supplement rather than replace the current direct funding measures.

2.2.3 Thematic versus generic funding

All in all, generic funding instruments are increasingly developed having in mind their application in strategically selected thematic areas and sectors. In September 2013 the Finnish Government approved resolution that specifies a package of measures for [the reform of research institutes and research funding](#). Among other initiatives of the reform a strategic research funding instrument will be established to boost research related to societal challenges. Research funding is subject to competition, and disbursed in support of social policy and society's functions and services.

¹ **Government direct R&D funding** includes grants, loans and procurement. *Government indirect R&D funding* includes tax incentives such as R&D tax credits, R&D allowances, reductions in R&D workers' wage taxes and social security contributions, and accelerated depreciation of R&D capital.

2.2.4 Innovation funding

All Tekes funding is in principle targeted to innovation funding. Its project funding for businesses, according to [the new strategy](#) is targeted in the following ways:

- One third for young SMEs
- Roughly one third for established businesses with less than 500 employees
- Less than one third for businesses with more than 500 employees if external impacts on other actors are significant, or if the company is essentially reinventing its business operations

Funding is channelled through different operating methods, which are:

- Around 40% for customer initiatives based on demand;
- Around 20% for research programmes of the Strategic Centres for Science, Technology and Innovation (SHOK);
- Around 25% to focus areas through Tekes programmes;
- Around 15% to other strategic choices

In particular, one relevant initiative of innovation funding is **the Strategic Centres for Science, Technology and Innovation (SHOK)**, which are cooperation platforms for innovative companies and spearheading research. The SHOKs are networks of a new type that engage in intensive and long-term work to achieve shared goals. The introduction of the SHOK concept has created important structural changes in Tekes funding to selected strategic areas. One relevant tendency in Tekes funding has been to increase support to start-ups and fast growing SMEs in different sectors.

In 2008–2012, the Finnish Funding Agency for Technology and Innovation TEKES has funded Strategic Centres for Science, Technology and Innovation (SHOK) research programmes by a total of EUR 373 million. The companies have funded 40 per cent of research programme costs. Almost 500 companies and approximately 30 research organisations have participated in SHOK research programmes. In addition, the Academy of Finland has allocated funding and special application processes on fields with SHOK research. An international evaluation of SHOKs was published in February 2013. The operating model will be developed further on the basis of evaluation outcomes. The evaluation of SHOKs was quite critical towards their achievements, which generated [big headlines in the media](#) and subsequently heated discussions. The main argument was that although the SHOKs received about 800 million euros in 2008–2012, the results remained meagre, at least for the time being. The evaluators listed a number of problems and failures pinpointing why the SHOKs fell short of their ambitious goals.

Alongside Tekes, the Growth Company Service of [EnterpriseFinland](#) provides funding instruments to support SMEs. Additionally Finnvera (a specialised financing company owned by the State of Finland), VeraVenture (subsidiary of the former), Finnish Industry Investment and regional ELY-Centres all have instruments that support innovative start-ups. Most of these instruments are related to general funding support for businesses but in many cases these also target (innovative) start-ups.

2.3 Research and Innovation system changes

[The Finnish National Reform Programme \(2012\)](#) identified the most important substantive reforms of the research and innovation policy to be the creation and introduction of new means and models to strengthen innovation activity, the establishment of attractive clusters of expertise, internationalisation, structural development of higher education, reform of research institutes, and organisation of infrastructure policy and the tenure track system.

Education

The most significant structural change in recent years has been **the university reform** (with [the new University Act](#) in 2010) that has addressed the issue of universities to have more flexibility to promote high-level research, internationalisation and focusing of resources. The act has also increased the autonomy of universities, making them autonomous legal entities. This has been followed by mergers of several universities decreasing the amount of universities to 16. Also a new [university funding model](#) came into force in January 2013. The aim of this model is a better, more efficient international university system with stronger impact and a better-defined profile. One key change proposed by the committee to the model used in 2010–2012 is greater emphasis on quality. Funding will no longer be allocated on the basis of target number of degrees, and the relative weight of scientific publications is expected to grow. Universities have also introduced a tenure track as the core academic career system to offer well-supported career path based on the principle of commitment from university and individual to academic career; it has clearly defined expectations, incentives, and assistance in personal development (see more, for instance on [the tenure track of Aalto University](#)).

In parallel, [the polytechnic reform](#) recorded in [the Government Programme](#) started in September 2011 and the Polytechnics Act, which took force from the beginning of 2014. According to the Government Programme, the responsibility for polytechnic funding as a whole will be transferred to the government, and polytechnics will be made independent legal entities. The objective is to strengthen the role of polytechnics as increasingly independent educators supporting the competitiveness of the regions. The reform is implemented via changes in legislation and the renewal of operating permits.

The university and polytechnic reform including new financial model has profound implications on the teaching and research staff and on the preconditions of Finnish research. This is happening in parallel with the reductions in higher education spending. As a consequence many degree programmes may face closing down in the near future. The cuts hit hardest polytechnics in sparsely populated areas but also many universities have laid off their personnel. Universities are allowed and even encouraged to attract private money from the business sector. With the exception of Aalto University, they have not been particularly successful.

The reforms will have long standing impacts on the HEIs future developments. Depending on whether a HEI reaches or surpasses its targets, it will be rewarded by more financial resources or vice versa. Those who fail will face reduced funding. Here, it is worth noting that the most indicators may not capture and encourage sufficiently the quality. For instance, if the indicator measures passed study weeks, it will encourage the loosening of standards. If a university needs to demonstrate efficiency in the sense of producing fast a lot of completed degrees, it may get tempted to relax its requirements.

The Ministry is simultaneously putting pressure to accelerate mergers or at least enhanced collaboration between provincial universities and polytechnics which will modify the HEI land-

scape. The ultimate goal is to reduce their total number. At present, alliances have emerged, for instance, FUAS Federation of three Universities of Applied Sciences in South Finland, namely HAMK, LAMK and Laurea.

Research

In September 2013 the Finnish Government approved resolution that specifies three packages of measures for [the reform of research institutes and research funding](#) and identifies the ministry responsible in each case. These three sets of measures comprise structural reforms, research funding reforms, and the implementation and follow-up of the reforms. The overall reform will be implemented in 2014–2017. The objective of the overall reform is to strengthen multidisciplinary, high-level research of social significance. It will also seek to free up resources from research support services and fixed structures for redeployment in research activity and to organise research institutes into larger and stronger wholes.

The aim of this is **stronger multidisciplinary research organisations**, capable of competing with other European research institutes for funding, and greater cooperation between research institutes and universities. Through the reform, Agrifood Research Finland, the Finnish Forest Research Institute and the Finnish Game and Fisheries Research Institute will be merged to form the natural resources institute Finland. The Finnish Geodetic Institute; issues related to the Inspire project and the development and promotion of joint use of geographic information under the National Land Survey of Finland; and the sector-dependent information systems of the Information Centre of the Finnish Ministry of Agriculture and Forestry, along with the related system development, will be merged to form a research and development centre for geographic information. The VTT Technical Research Centre of Finland and the Centre for Metrology and Accreditation will be merged to form a multi-technological research and development centre; preparations will be launched to turn the new centre into a profit-based, fully state-owned company with a special assignment. In 2015, the National Consumer Research Centre and the National Research Institute for Legal Policy will be merged with the University of Helsinki to form institutes or units based on national special assignments.

In addition to the structural reform of research institutes, deeper, network-based collaboration will be required, crossing the boundaries of government agencies and public bodies. The activities begun under the framework of the Finnish Natural Resource and Environmental Research Consortium (LYNET) and the Consortium of Expert Institutions on Health and Welfare (SOTERKO) will be developed and expanded in order to improve the quality, productivity and impact of research and consultancy.

Furthermore, the Academy of Finland provides funding for the acquisition, establishment or **upgrading of nationally significant research infrastructures** that promote scientific research. The Finnish Research Infrastructure Committee ([FIRI Committee](#)) updated Finland's national roadmap for infrastructures in 2013 and assessed the urgency and priority order of projects included in the roadmap.

2.4 Recent Policy developments

The 'Research and Innovation Policy Guidelines for 2011-2015' (Research and Innovation Council) and the 'Growth through expertise, Action plan for research and innovation policy' (MEC and MEE, 2012) are two key policy documents which set out at national level the policy guidelines on the required measures and funding and detail out the actions required for the implementation of the government's research and innovation policy.

[The Government budget for 2013](#) included two tax incentives aimed at growth seeking businesses. **The Tax Incentive for Private Investors** targets business angels investing equity in SMEs. The incentive provides a possibility to postpone paying capital gains taxes as long as those gains are re-invested in qualifying businesses. **The R&D Tax Credit for SMEs** is a deduction from corporate income taxes tied to the wage costs of R&D personnel in Finland. This incentive is estimated to have a fiscal cost of up 200 million euros in the first year of operation. Presumably the R&D tax incentive supplements rather than replaces the current R&D subsidies.

[Government decision on central government spending limits for 2014 – 2017](#) in April 2013 stated that:

- A new research, development and innovation programme will be launched with Academy of Finland funding to support the programme and implementation of the ICT 2015 programme, the Academy of Finland's annual funding authority will be increased by EUR 10 million from 2014.
- The Government will launch a major growth funding programme in order to strengthen the capital investment market and to support SME growth. The programme will be financed through both government and private investment. Taken together, investment in these funds may run into billions of euros.
- During the budget planning period annual capitalisations of EUR 30 million will be made into Finnish Industry Investment in order to start a new growth fund for growth-stage businesses.
- In 2014–2017, capital investments in Finnvera will be increased by EUR 5 million in order to support the growth of start-up businesses through direct investment. During the planning period annual investments of EUR 20 million will be made from the Finnish Funding Agency for Technology and Innovation (Tekes) lending authority to capitalise seed companies. From 2014, as part of the growth funding programme, Tekes will gradually take over responsibility for the provision of early-stage public development subsidies, including capital investment activities.

In September 2013 the Finnish Government approved resolution that specifies three packages of measures for [the reform of research institutes and research funding](#) and identifies the ministry responsible in each case. These three sets of measures comprise **structural reforms, research funding reforms**, and the implementation and follow-up of the reforms. The overall reform will be implemented in 2014–2017. The objective of the overall reform is to strengthen multidisciplinary, high-level research of social significance. It will also seek to free up resources from research support services and fixed structures for redeployment in research activity and, by field of research, to organise research institutes into larger and stronger wholes.

2.5 National Reform Programme 2013 and R&I

[The National Reform Programme 2013](#) intends to diversify the business structure, in particular by hastening the introduction of planned measures to broaden the innovation base. In particular, the programme notes that in order to accelerate economic growth in 2013 and 2014, a tax incentive for research and development activities, double depreciation right as well as tax relief for investments in 2013–2015 will be utilised.

In 2012, ICT 2015 working group was appointed to prepare a strategy to mitigate the effects of the sudden structural change in the ICT sector as well as to reform the information and communications technology sector and to increase its competitiveness. The working group proposes, for instance, a ten-year research, development and innovation programme and a new financing programme to ensure sufficient funds for start-ups and companies in the growth phase.

In 2012, the Government approved the decrees related to the revision of university funding model. Government appropriations will be directed especially on the basis of completed qualifications and credits as well as scientific publications and competed research funding. Funding of universities of applied sciences will be revised to better support educational targets, such as improvement of the quality of teaching and research. The university funding model was revised at the beginning of 2013 and that of universities of applied sciences will be revised at the beginning of 2014. The number of completed qualifications and study progress will affect funding more than before. The reform is meant to improve completion of studies, accelerates the transition to working life, boost the quality and internationalisation of teaching and research, and strengthens the specialisation of higher education institutions.

Research activities were consolidated by launching a research infrastructure policy. Additional funding was granted in 2012 and the national road map was updated in 2013. In 2011–2013, open access to research publications and materials was increased. This improves the efficiency of research and innovation activities and enables wide-ranging use of research results and materials.

The Commission's analysis of the National Reform Programme 2013 leads it to conclude that whilst investment in research, development and innovation continues to be high, a critical issue remains the efficiency with which this research is translated into innovations and new high-growth companies, which can penetrate fast growing export markets and strengthen international competitiveness. In the short term, Finland should implement recently adopted policies and measures to improve the research and innovation system such as the new action plan, and propose further reforms, where relevant, based upon existing evaluations and foresight work.

2.6 Recent evaluations, consultations, foresight exercises

Government reviews, studies, evaluations and guidelines act as the instruments that guide and inform science policymaking at the national level. [The Government working group for the coordination of research, foresight and assessment activities](#) is a body facilitating cooperation and exchange of information between the Finnish ministries. Once during each electoral period, the Government submits to Parliament [a foresight report on long-term perspectives](#). The focus of each report is on a defined set of strategically significant issues that will impact the Government's key policies over the coming 10-20 years. The foresight report gives the Government's view on the chosen issues and associated policies. Several different types of foresight activities have also been carried out for instance by the Committee for the Future, one of the 15 standing committees of the Parliament of Finland, by the ministries, Tekes and the Academy of Finland as well as research institutes and universities. Foresight studies have often been organised in association with research programmes of the Academy of Finland or Tekes programmes and their focus has been rather narrow.

Evaluations are used extensively to assess the operation of individual organisations such as universities, the Academy of Finland or Tekes. [The evaluation of Tekes](#) was published in June 2012 and it stated, for instance that 'Tekes' activities have boosted research, development and

innovation and enhanced their quality; and that Tekes should not be merged with other public financing organisations, such as Finnvera. Instead, the division of duties between actors in the field should be clarified and the assessment and selection process of financing applications must be expedited. [The external evaluation of the strategic centres for science, technology and innovation \(SHOKs\)](#) in 2013 provides insights and critical perspectives on one of the main industry-driven instruments of Finnish innovation policy. For instance, despite major advances SHOKs also face important challenges that include i) multiple and often internally contradictory objectives, ii) tensions between short and long-term perspectives and iii) lack of international activities.

[The evaluation of the Academy of Finland](#) finished in 2013. It considered the Academy successful in its mission to finance high-quality scientific research and that the portfolio of funding instruments meets the expressed needs of the Finnish research community. The evaluation panel recommends a more active role for the Academy in science policy. The evaluation recommends that the Academy's role should be extended into strategic research funding. The Ministry of Education and Culture is also encouraged to consider transferring budget funds from university core funding to the Academy in order to boost the volume of research funded by means of competitive bidding. The Academy of Finland published [the state of the scientific research in Finland 2012](#), which reviews the state and position of the Finnish research system as an international comparison and includes the relative strengths of different scientific disciplines and areas in need of further development.

Furthermore, [the evaluation of the effectiveness of the Research and Innovation Council](#) has started and the results will be published in March 2014. The project will evaluate the Council's role, position and operations. The activities of the National Institute for Health and Welfare and the Finnish Institute of Occupational Health will be assessed by 30 June 2014. This will include an evaluation of the suitability and compatibility of the institutes' strategic research areas, and of their key development and administrative tasks, taking account of feed-in requirements related to decision-making and steering within government. In addition, thought will be given to the possible elimination of overlapping functions and the appropriate division of labour and research tasks between universities and research institutes.

2.7 Regional and/or National Research and Innovation Strategies on Smart Specialisation (RIS3)

The national regional policy liaises with the European Union (EU) cohesion policy. For the next period of the EU Structural Funds 2014-2020, research and innovation are among the priorities. In Finland, the focus is expected to be on enhancing infrastructure and capacities, promoting business R&I investment and a range of innovative actions through smart specialisation as well as supporting technological and applied research, pilot lines and early product validation.

The institutional role of the regions in the research and innovation policy used to be small and most policy decisions were made at the national level. Local and regional actors have grown in significance in education, research and innovation policy. Regions are also carrying out foresight activities and strategy formulations of their own. Regional concerns have an effect on the national policy in some respects, however. For instance, the Ministry of Education and Culture reconciled the objectives of the national research policy and the regional policy in a strategy document entitled "Regional strategy for accomplishing education and research policies until 2013".

Regional Councils are appointed by the municipalities and are therefore politically representing the local governments. The main instruments for funding their policies are the Operational Programmes co-funded by Structural Funds (SF), the national government and the local governments. With the increasing focus of SF towards research and innovation, the role of regions as research and innovation policy actors has become somewhat more important.

The regional actors together with the national government and HEIs have jointly contributed to the establishment of six regional university centres in several non-university towns. The university centres gather the operations of several universities in one location in these towns. One of the HEI reform's targets aims to clarify the division of labour between universities and polytechnics by further differentiating their profiles. Polytechnics should primarily serve the practical needs of regional enterprises.

The main funding source of the R&D activities at polytechnics was the Structural Funds – ERDF and ESF – already in the previous programming periods, whereas polytechnics have been less active in Tekes and FP projects. The question remains whether the pronounced innovation emphasis in structural funds will finally make such a big difference as the regional polytechnics already belong to the major beneficiaries of Centre for Economic Development, Transport and the Environment (ELY) funded projects and the ELY Centres may be challenged in providing sufficient support to potential beneficiaries.

In the programming period 2007-2013 the [Centre of Expertise Programme](#) has been administered by the MEE and it has formed national clusters of expertise to enhance networking between the regional centres of expertise and to function as the new platform for development of inter-regional co-operation.

To attain the targets of regional development in Finland the Government has drawn up special programmes. The programmes are the on-going Centre of Expertise Programme (OSKE) and the Regional Cohesion and Competitiveness Programme (in Finnish KOKO) that ended in 2011. The government [action plan for research and innovation policy](#) foresees that regional cooperation will be intensified with [the INKA \(Innovative Cities\) programme](#) to be launched at the start of 2014 to replace OSKE. The programme encourages major urban areas in Finland to choose strategic focus areas and generate competence-driven business with the help of new kinds of development environments and lead markets. The aim is to use investments in development made by the state and the urban regions in order to generate openings that are based on international competence and also provide international visibility. Resources from structural funds from the period 2014–2020 are directed to comparable projects in innovation clusters. Major land use, housing and traffic infrastructure projects implemented in cities will be used as new types of development and testing environments for innovations. A region-specific negotiation procedure will be created for the most significant innovation clusters, with participation from national financiers, such as the Finnish Funding Agency for Technology and Innovation (Tekes), the Ministry of Employment and the Economy and, where necessary, the Ministry of Education and Culture and other ministries. [The growth agreement](#), also coordinated by the Ministry of Employment and the Economy, requires cities making choices in accordance with the Smart Specialisation Strategies of the European Union.

Regional Innovation Scoreboard 2012 accompanied by the “[Regional Innovation Scoreboard 2012 Methodology report](#)” covers four regions: Itä-Suomi (FI13), Etelä-Suomi (FI18), Länsi-Suomi (FI19), Pohjois-Suomi (FI1A), Åland (FI2). According to the scoreboard Finland is an innovation leader, but 2 Finnish regions lag behind in their innovation performance, in particular Åland (FI2) which is a moderate innovator. Finland has a mix of different types of regions, being

the low user/absorber regions of most importance in both periods (40%), together with full users/absorbers in the period 2000-06. Etelä-Suomi (FI18) is the only FP leading absorber region, whereas Itä-Suomi (FI13) became a SF leading user in the period 2007-13.

The following regions take part in the S3 Platform of the European Commission:

- Ostrobothnia
- Lapland
- Satakunta
- Päijät-Häme (Lahti)
- Oulu Region (Pohjois-Pohjanmaa)
- South Ostrobothnia (Etelä-Pohjanmaa)
- Kainuu
- Lappeenranta–Imatra (urban sub-region, part of South Karelia)
- North Karelia (Pohjois-Karjala)
- North Savo (Pohjois-Savo)
- Tampere Region (Pirkanmaa)
- Helsinki-Uusimaa Region (Uusimaa incl. Helsinki, the capital)
- Southwest Finland (Varsinais-Suomi)

The first four regions taking part in the S3 platform were:

- Ostrobothnia: The Regional Council of Ostrobothnia joined the platform in January 2012. Ostrobothnia performs favourably when it comes to R&D indicators, human capital indicators and potential for innovation. Nevertheless this is very much an effect of the domination of the large industry around Vaasa. The economy in the region is dominated by SMEs with a limited potential for R&D and innovation. It is further noticed that the contents of the innovation policy are not clearly specified and that the R&D system is dominated by private rather than public research activities. This all forms a challenge for the public sector policies in the Region.
- Lapland: The Region of Lapland is running [a S3 project 2012-2013](#) to prepare for the S3 programme, including e.g. workshops and interviews. The project focuses on new opportunities of the Arctic region. The update of Innovation Strategy 2013-2016 for Universities and Education Centres is under preparation. There is a promising participatory process under way, organized by the Project 2012-2013 by the Regional Council of Lapland, to identify the priorities in Lapland. An interactive workshop in Dec 2012, participated by 44 decision-makers in Lapland, to reveal/identify the most interesting and potential projects. The main challenges of the region deals with a) finding the balance in development of supporting activities between basic industry (back bone of the economy) and emerging and evolving field of industries (particular important in rural settlements), b) encouraging micro level industries to grow and c) encouraging private R&D+I serving also the (micro level) SMEs.
- Satakunta: [The Regional Council of Satakunta](#) designs a supporting implementation strategy, the Regional Programme. The Regional Council prepares the related Implementation Plan, which includes indicative funding and actors. RIS3 is going to be included in these processes. Especially, international cooperation is considered to be a way to strengthen the regional strategic plan and its implementation. The Future Handbook for Satakunta Region 2035 represents foresights of regional values and interests and provides guidance for RIS3.

- Päijät-Häme (Lahti): [The Lahti region](#) had been working with Smart Specialisation even before the term was widely introduced. The case of Lahti indicates that even a region that is poor in R&D resources may show a high degree of innovativeness. The first phase of Smart Specialisation regional strategy in Lahti consisted of the abandonment of the strategic cluster emphasis. The strategic combination of the new innovation philosophy with the top three areas of expertise led to a novel innovation environment, that could be renamed a preliminary phase of Smart Specialisation (Ortega, 2012).

2.8 Policy developments related to Council Country Specific Recommendations

[The Council Country Specific Recommendations](#) support Member States and the Commission in coordinating their economic and budgetary policies. In relation to research and innovation the 2011 recommendations advised Finland to continue efforts to diversify the business structure, in particular by hastening the introduction of planned measures to broaden the innovation base while continuing to align wage and productivity developments.

The Government has safeguarded an adequate level of research, development and innovation funding and clarified the division of responsibilities of actors that distribute public financing. In particular, the following measures have been taken forward in response to the commitment to the National 2020 R&D target of 4%/GDP: Research and development tax deduction and temporary growth; entrepreneurship incentive, reallocation of public research funding; a proposal for a reform of central government research institutions. However, GERD declined between 2009 and 2012 from 3.94% to 3.55%. Research and innovation tax incentives for businesses have been strengthened.

In 2012 the Government also introduced new measures that will enhance especially through the INKA programme the role of the regions in implementing the national innovation strategy as growth platforms for innovations. A negotiating procedure and growth agreement preparations have been initiated for the creation of appealing innovation clusters. This will promote cooperation and coordinate the use of resources between key actors in the metropolitan regions and central government.

3 PERFORMANCE OF THE NATIONAL RESEARCH AND INNOVATION SYSTEM

3.1 National Research and Innovation Policy

[The Innovation Union Scoreboard 2013](#) positions Finland among other innovation leaders including Sweden, Germany and Denmark, which show a performance well above that of the EU average. The relative strengths of Finland are in Human resources and Finance and support. Relative weaknesses are in Open, excellent and attractive research systems. High growth is observed for Community trademarks, Knowledge-intensive services exports and License and patent revenues from abroad. Growth for Knowledge-intensive services was the highest off all Member States. A relatively strong decline is observed for Innovative SMEs collaborating with others SMEs innovating in-house. Growth performance in Intellectual assets and Innovators is well above average and in Firm investments and Linkages & entrepreneurship well below average.

[The Finnish National Reform Programme \(2012\)](#) identified the most important substantive reforms of the research and innovation policy to be the creation and introduction of new means and models to strengthen innovation activity, the establishment of attractive clusters of expertise, internationalisation, structural development of higher education, reform of research institutes and research funding, and organisation of infrastructure policy and the tenure track system. Overall, the number and scale of reforms taking place signal the continuous commitment to a broad and ambitious R&I policy.

Table 3. Key performance figures of the R&I system

HUMAN RESOURCES	
New doctorate graduates (ISCED 6) per 1000 population aged 25-34	2,56 (2010)
Percentage population aged 25-64 having completed tertiary education	39,7 (2012)
Open, excellent and attractive research systems	
International scientific co-publications per million population	1323 (2011)
Scientific publications among the top 10% most cited publications worldwide as % of total scientific publications of the country	11,5 (2008)
Finance and support	
R&D expenditure in the public sector as % of GDP	1,15 (2011)
Public Funding for innovation (innovation vouchers, venture/seed capital, access to finance granted by the public sector to innovative companies)	1.319 (2010)
FIRM ACTIVITIES	
R&D expenditure in the business sector as % of GDP	2,67 (2011)
Venture capital and seed capital as % of GDP	0,20 (2011)
Linkages & entrepreneurship	
Public-private co-publications per million population	98 (2011)
Intellectual assets	
PCT patents applications per billion GDP (in PPS€)	10,2 (2009)
PCT patents applications in societal challenges per billion GDP (in PPS€) (climate change mitigation; health)	1,07 (2008)
OUTPUTS	
Economic effects	

Medium and high-tech product exports as % total product exports	1,69 (2011)
Knowledge-intensive services exports as % total service exports	35,9 (2010)
License and patent revenues from abroad as % of GDP	1,22 (2011)

3.2 Structural challenges of the national R&I system

Finland's competitive position is facing challenges and its large export businesses have suffered. Considering its high level of R&D inputs, the country has a relatively low contribution of high-tech and medium-high-tech goods to the trade balance. Within the past few years, the decline of the important electronics (telecommunications) sector in particular has created pressure for structural change in Finland. The decline of this sector is reflected in a decrease in business R&D investments – dominated by Nokia. Consequently, as part of the Europe 2020 strategy, the Council recommended that Finland continues efforts to diversify its business structure, in particular by hastening the introduction of planned R&I measures to broaden the innovation base in order to strengthen productivity growth and external competitiveness. The extent to which the business and public sectors will be capable of absorbing new innovations from the ICT sector – and more concretely the available highly-skilled human resources – is considered a determinant for new growth.

Overall, one of the key challenges identified is the research and innovation system as a whole has over the decades become complex and difficult to administer. As a result, recommendations to make reforms in the whole education, research and innovation system have been suggested since 2009 (MEE & MEC, 2009).

Finnish strategic objectives for research and innovation policies have undergone gradual changes during the past years. One of the key points identified in the 2009 international evaluation was that despite having good labour productivity development and high levels of R&D, the main weaknesses of the Finnish research and innovation system are a lack of growth entrepreneurship and difficulties in internationalisation. There are also several structural problems in the system with a complex support system as well as structural challenges related to research performers (universities and public research organisations). Based on the international evaluation and other policy documents (see Section 2) the key challenges can be summarised as follows.

Weak internationalisation of the research and innovation system

Internationalisation of science has been a policy objective in Finland for quite some time, but so far the results of the policy measures have been modest. According to report on [the state of scientific research in Finland 2012](#) only 13% of the researchers in Finnish universities were foreigners. The same report though notes that co-publishing with foreign researchers has increased considerably since 1990; between 2006 and 2009 49% of scientific publications were co-published with foreign researchers. The share of foreign R&D-investment as a share of private R&D in Finland was 7% in 2010 (OECD, 2012), which is low in international comparison.

The structural weakness of internationalisation also applies to human resources more broadly. The international evaluation of the research and innovation system (MEE & MEC, 2009) concluded that the “lack of global insight and foreign expertise” gained through foreign immigrant human capital, foreign R&D investments and venture capital investments is a major challenge in the global knowledge economy. In addition to that the level of foreign direct investment is low compared to other leading countries; in terms of commercialisation, there is also a visible lack of foreign co-patents.

It has been noted that a particular challenge for Finland in its efforts to attract foreign talents relates to research and innovation environments and researcher salaries in the public and higher education sectors, which in many cases have not been competitive enough (Viljamaa et al., 2010). Many other countries have also invested more in developing national research infrastructures than Finland, for example, with concrete investment programmes for several years (Viljamaa et al., 2010).

The quality of scientific research

[The 2012 report on the review of the state of research in Finland](#) evaluates Finnish research as relatively good and stable; however, what remains a concern is that the number of researchers at the very top of their field remains low in Finland. Finland needs more high-quality, leading edge research. In 2008–2010, a total of 15,674 scientific publications were published in Finland, 6% more than in the mid-2000s. Finnish publications received 6% more citations than world publications on average in 2008–2010. This is slightly more than in the early part of the period under review, when Finland's relative citation impact was around the world average. In 2008–2010, 9% of Finnish publications ranked among the world's top publications. This is roughly the same figure as in the world on average and behind other Nordic countries.

Finnish universities in general do not fare that well in international comparisons. The only Finnish university ranked in top-100 of [the Shanghai ranking in 2012](#) is the University of Helsinki. Also in [the Times Higher Education World University Rankings](#) in 2013, the University of Helsinki is the only Finnish university among the best 200 universities in the world. Most Finnish universities rank average in the international university rankings due to relative few fields of international excellence. The regional policies of Finland may have also affected the level of science in several Finnish universities while several of them have been established in remote locations based more on equal regional policy than actual demand.

There may be more a profound decline in the quality of research base. Professors and other academic teachers have been complaining already for a while that the skill level of freshmen is declining, which is particularly pronounced in mathematics and natural sciences. Student–teacher ratios are lower in Finland than in the top universities of the world. Finnish universities lack resources to hire competent tutors for postgraduate students. They offer only few regular postdoc vacancies and salaries have to compete with industry. Also the PISA results for Finland in 2013 dropped in the OECD's comparison of test results from 15-year-old pupils in 65 countries and regions.

The fragmentation of the higher education and the public research sector

The quality of research and its efficient use in the society is linked with the structure of the research system. According to the international evaluation of the Finnish research and innovation system (MEE & MEC, 2009) the Finnish higher education and public research system is fragmented, which makes it more difficult to focus resources and to provide high-level research. According to the evaluation the system can be seen as fragmented in three dimensions: firstly, resources are scattered in three different types of organisations with overlapping tasks – universities, polytechnics and public research organisations (PROs). Secondly, these institutions are scattered around the country with several rather small units. Thirdly, the universities have been internally fragmented in several rather small units. (Viljamaa & Lahtinen, 2011.)

Further emphasis on supply side measures

The Finnish research and innovation system relies mainly on supply side instruments for R&D support. This has been effective in the past but may lack the dynamics for supporting those research fields and industry sectors that are new, on the rise and outside the scope of current strategies. There is an initiative to develop more demand-side policies to support innovation.

In terms of policy and the functioning of the research and innovation system, policy makers seek to cater for the needs of a wide spectrum of potential users who operate under a range of circumstances. As a result, the business support system has become excessively complex to both access and administer. From the perspective of an outside observer (such as, for instance, a potential entrepreneur), programmes often seem to overlap with other programmes and on some occasions multiple public agencies appear to work broadly in the same area and/or with the same firm. In terms of policy and the functioning of the research and innovation system, policy makers seek to cater for the needs of a wide spectrum of potential users who operate under a range of circumstances. As a result, the business support system has become excessively complex to both access and administer. (MEE & MEC, 2009.)

Concentration of private R&D to few sectors and businesses

Businesses in general have high investment rates in innovation activities and there is also a high involvement of the private sector in the financing of domestic R&D activities. Furthermore, the number of joint publications between private and public actors is relatively high. Aside from the electronics sector, many manufacturing and services sectors have increased their R&D intensity during the last decade. Finland has a growing entrepreneurship culture, a relatively robust venture capital industry and a very high relative number of young patenting firms (OECD, 2012). International co-operation in science and innovation is mixed: 50% of scientific articles, slightly above the OECD median, but 19% of PCT patents, below the OECD median, are produced (OECD, 2012).

However, business R&D investments are still highly concentrated in Nokia and a few other large firms. This makes the economic position more vulnerable. Moreover, high-growth firms remain slightly less involved in R&D activities than the business sector as a whole. Since it is important to notice the high dependency of the system on one specific sector, ICT and especially the cluster that has been developed around one company, Nokia. In 2010, 52% of private sector R&D was concentrated in the Electronics, computers and electronic devices sector (Statistics Finland, 2012).

Another specific feature that has been identified is that Finland is not specialising in education-intensive sectors in production (and trade) as much as some other smaller economies. There is a heavy specialisation in high-tech and especially in ICT industries and manufacturing specifically, but less so in human capital-intensive production. This is also evident in the fact that the share of services and especially knowledge intensive services has been lower in Finland than in other leading countries (for instance Denmark, Sweden, and Belgium). These lead to a general challenge in that compared with high level R&D investments and business R&D, a relatively few world class advanced class services or goods originate from Finnish innovations or Finnish entrepreneurial firms.

It also seems that despite several instruments and organisations addressing innovative businesses there is a lack of more general support for entrepreneurial culture and especially a culture for going global. This has been evident in the lack of support for entrepreneurship as a career choice in the university system. Especially growth entrepreneurship and the development of young

innovative businesses have been considered a key challenge for policy and measures to address these issues have been planned.

3.3 Meeting structural challenges

Finland's innovation policy and measures in general are geared towards speeding up the development, commercialisation and take-up of new technologies. Important reforms of the research and innovation policy entail various measures for the establishment of attractive clusters of expertise, internationalisation, structural development of higher education, reform of research institutes and research funding, and organisation of infrastructure policy and the tenure track system, in particular.

In addition to general efforts in enhancing the efficiency and improving the internationalisation of its innovation system, current and planned policy reforms are targeted at increasing the number of high growth innovative firms as the major source of future employment growth. The introduced temporary R&D tax incentive from 2013 to 2015 represents a novelty in Finland and targets SMEs and cooperatives. Furthermore, a new tax incentive for private investors in start-ups has been introduced to increase the volume of the domestic venture capital market. These actions are expected to support especially knowledge- and innovation-based young growth enterprises. The Finnish Government has also recently fostered innovation and the country's transfer to a digital service economy by releasing non-sensitive public data.

Table 4 Challenges, policy measures and respective assessment

Challenges	Policy measures/actions addressing the challenge ²	Assessment in terms of appropriateness, efficiency and effectiveness
1. Weak internationalisation of the research and innovation system	<p>Foreign-established companies eligible for the Tekes funding</p> <p>Opening up of programmes and attracting international students and researchers.</p> <p>Strategy for the Internationalisation of Higher Education Institutions in Finland 2009–2015</p> <p>The mechanism for the public funding of universities supporting their internationalisation, the revision of university funding model.</p> <p>Finnish Centres for Excellences (CoE)</p> <p>Financing to support the outflow of researchers</p> <p>The FiDiPro –programme attracting</p>	<p>Given that Finland is a relatively small country, internationalisation and participating in cross-border joint initiatives have typically ranked high on the R&I agenda.</p> <p>Increased collaboration and coordination of public agencies and opening up and streamlining of instruments provide more comprehensive support for internationalisation of R&I system.</p> <p>Still, there is no overarching legislation governing Finland's participation in joint initiatives. Ministries, agencies have established their own practices and programmes that increasingly allow cross-border access to RIs.</p> <p>There are rules and practices to help foreign researchers and their families</p>

² Changes in the legislation and other initiatives not necessarily related with funding are also included.

	<p>talent</p> <p>The FinNode centres, Nordforsk and Baltic research alliances</p>	<p>in Finland but efforts have not been sufficient.</p>
<p>2. The quality of scientific research</p>	<p>The new University Act 2010), reforms of doctoral education and tenure track systems, University funding model (2013)</p> <p>The structural development scheme for polytechnics will be implemented in 2014.</p> <p>Reform of research institutes and research funding (2013)</p> <p>Research and Innovation Policy Guidelines for 2011–2015, international evaluations</p> <p>The Finnish Research Infrastructure Committee, updated Finland's national roadmap for infrastructures in 2013</p> <p>Strategic Centres for Science, Technology and Innovation (SHOKs) - evaluation (2013)</p> <p>Broader role for the Academy of Finland - evaluation (2013)</p> <p>The evaluation of the effectiveness of the Research and Innovation Council to be published in March 2014</p>	<p>Structural reforms of funding agencies, research institutes and universities have advanced creating relevant mergers and further coordination that are expected to support together with more excellence driven funding models increase in the quality of scientific research. However, diverging views exist of the benefits of the reform.</p>
<p>3. The fragmentation of the higher education and the public research sector</p>	<p>The university reform (with the new University Act in 2010)</p> <p>Reform of research institutes and research funding including the establishment of Strategic Research Council</p> <p>New coordination activities under the framework of the Finnish Natural Resource and Environmental Research Consortium (LYNET) and the Consortium of Expert Institutions on Health and Welfare (SOTERKO)</p>	<p>Structural reforms of funding agencies, research institutes and universities have advanced efficiently and are creating relevant mergers and further coordination.</p>
<p>4. Further emphasis on supply side measures</p>	<p>Research and Innovation Council, Tekes and MEE addressing supply side measures</p> <p>Research and Innovation Policy Guidelines for 2011–2015 (2010)</p>	<p>Important steps have been taken forward in the Government and its key agencies to address excessive emphasis on supply side measures. However, it is early to say if the new measures are improving sufficiently</p>

	<p>‘Growth through expertise, Action plan for research and innovation policy’</p> <p>The action plan and policy framework for demand and user-driven innovation by MEE.</p> <p>The reform of the Act on Public Contracts, so that public procurements pay greater attention to innovation</p>	the situation.
5. Concentration of private R&D to few sectors and businesses	<p>A joint-service 'Growth Track' intended for enterprises aiming at rapid growth and internationalisation</p> <p>The introduction by Tekes of a programme for funding young, innovative companies</p> <p>The renewal of Finnvera's export guarantees schemes</p> <p>The expansion of the Vigo Accelerator Programme</p> <p>The Tax Incentive for Private Investors targets business angels investing equity in SMEs</p> <p>The R&D Tax Credit for SMEs is a deduction from corporate income taxes tied to the wage costs of R&D personnel</p> <p>IPR Box providing a lower corporate tax rate on revenues coming from intellectual property rights (IPRs).</p> <p>ICT 2015 working group (2012) preparing a strategy to mitigate the effects of the sudden structural change</p> <p>Government decision on central government spending limits for 2014 – 2017 in April 2013</p> <p>Tekes, the new strategy with emphasis on growth companies.</p>	<p>The focus of public R&D&I funding has been effectively shifted to SMEs which are growth-oriented, job creating and are successfully establishing international connections.</p> <p>Structural reforms of funding agencies and further coordination are expected to support together with new funding models increase in the diversification and growth businesses.</p>

4 NATIONAL PROGRESS IN INNOVATION UNION KEY POLICY ACTIONS

4.1 Strengthening the knowledge base and reducing fragmentation

Promoting excellence in education and skills development

Finland had the highest number of R&D personnel as a proportion of the total employment in Europe. The same result was found in an examination of R&D personnel employed in the higher education sector and the government sector, for instance in government research institutes. In 2010, 23 persons per 1,000 employed persons worked in R&D position in Finland. Seven of them worked in the higher education sector and three elsewhere in the government sector. ([Academy of Finland, 2012](#)). According to [the State of the Union Country Report 2013](#), Finland has strong innovation performance overall and outperforms its reference group in terms of highly skilled human resources. However, the share of new doctoral graduates was lower in Finland than in the reference group in 2011. The main weakness of the Finnish innovation system lies in its low level of internationalisation. Finland performs below the EU average in inward BERD, share of foreign doctoral students and participation in EU excellence-driven funding programmes. In Finland there were 2,9 new doctorate graduates (ISCED 6) aged 25-34 per 1000 population in 2009 (Eurostat).

It is worth mentioning that recent economic downturns and structural reforms in HEI have led to growing number of high educated employed. Some unemployed academics establish companies of their own; others go to re-education if they regard perspectives in the job market hopeless in terms of their background. Still, there is simultaneously a need to attract more qualified researchers and other labour in order to support and sustain the relatively high level of Finnish research and innovation system that was ranked in top five by the [Innovation Union Scoreboard 2013](#). The amount of researchers has risen during the past few years. This has not, however, been reflected in the share of foreign researchers or in the mobility of either students or staff at Finnish HEIs. Persistent weaknesses in the Finnish research system for attracting researchers from abroad include limited career opportunities for researchers with few permanent positions and therefore a dependence on short term funding, the remuneration level has been lower than in many other European countries, families and especially spouses have had difficulties in getting a job, and the administration issues, for instance in universities, have also been seen as a challenge. There are rules and practices to help foreign researchers to work in Finland. Information is fragmented however and there has not been a dedicated programme to facilitate the immigration of foreign experts. Partly due to above challenges, the private sector has recruited relatively low numbers of foreign researchers except the few international businesses.

Enhancing international cooperation is considered important in Finland because it is closely linked to the degree of internationalisation of science and the mobility of researchers. The governmental programme to ensure that recruitment policies are developed in a way that makes research careers, both studying and working in Finnish universities and Higher Education Institutions, more attractive. An action plan for making research careers more attractive was launched in 2007. The Finnish universities are fully autonomous as employers under the Act on Universities (2010) and thus the Ministry of Education and Culture is not at all involved as a

negotiating partner in the employment contracts of the academic personnel. Strategy for the Internationalisation of Higher Education Institutions in Finland 2009–2015 orients the recruitment processes in higher education institutions.

National legislation offers a code on research practice and national bodies advise on practice and misconduct. Finland established a research code in 2002 offering guidelines on good scientific practice and dealing with instances of misconduct. This includes a National Advisory Board on Research Ethics, which amends and imposes the guidelines and offers a point of call for business research that might be in breach of them. Furthermore, publicly-funded fellowships, stipends, grants or equivalent provide sickness, unemployment and old-age benefits for researchers. The principles of the European Charter for Researchers' & the 'Code of Conduct for the Recruitment of Researchers' were signed by the Rectors' Council of the Finnish universities and the Academy of Finland in 2009. The principles are being promoted through national higher education and research policy. However, in a survey of early stage researchers in twelve European countries, only 3% of the Finnish respondents have ever heard of the Charter & Code (EURODOC, 2011).

Research and Innovation Policy Guidelines for 2011–2015 defines a measure to attract international students, researchers and experts. The recruitment practices of higher education institutions and research institutes are changed to attract international students, researchers and experts. It includes a measure to enhance access to research funding of American researchers in Finland. The Ministry of Education will increase its annual appropriation to the Fulbright Center by 50% from 2010. The extra investment aims at directing a larger share of the Fulbright Center funding to supporting talented young researchers, teaching cooperation between higher education institutions and inviting top American researchers to Finland. The Academy of Finland has signed the Money Follows Researcher (MFR) agreement, the initiative of the recently dissolved European Heads of Research Councils (EUROHORCs).

[The FiDiPro –programme](#) is one of the tools established in Finland to tackle the issue of attracting talent from abroad alongside the rather new four-tier career model. Additionally Joint Degree Programmes have been initiated in Finnish universities to target foreign students aiming at Master's Degree level. So far the actions taken have not improved the situation and therefore other policies or measures should be considered.

The Academy of Finland has a commitment to promoting the internationalisation of Finnish science and research by establishing bilateral agreements with countries and regions. The Academy of Finland provides funding for the [Finnish Centres for Excellences](#) (CoE) in order to support international cooperation in research. More could still be done, however, as Finland is not considered a hotbed of scientific research and fails to attract foreign researchers on a larger scale. Financing to support the outflow of researchers is provided especially by the Academy of Finland and Tekes. Publicly funded grants or fellowships by the Academy of Finland are portable to other EU countries. However, administrative processes remain problematic, thus discouraging researchers from going abroad. National grants or fellowships by the Academy of Finland are open equally to all nationalities subject to the research conducted being to the benefit of Finland to some extent. For specific mobility support, the use of EU mobility schemes is promoted.

The 'National Guidelines for the Development of Doctoral Training' (2011) have been prepared for the universities. Since 2011, all Finnish universities have started the reform of the doctoral training system in line with the principles of innovative doctoral training.

Research Infrastructures

For a small country like Finland, it has been pertinent to participate in organisations building large research facilities, namely:

- European Organization for Nuclear Research CERN
- European Molecular Biology Laboratory EMBL
- European Space Agency ESA
- European Southern Observatory ESO
- European Synchrotron Radiation Facility ESRF.

“Growth through expertise: Action plan for research and innovation policy” of RIC in 2012 launched a measure that allocates funding for research infrastructure. Appropriations for the budget line item on research infrastructure will be confirmed for 2014 to 2017. In addition, funds from the structural fund period will be directed to research infrastructures that are either national or located in Finland and networks supporting them. In 2013, the FIRI Committee (Finnish Research Infrastructure Committee) prepared the update of the national roadmap for infrastructures.

“National-level research infrastructures: Present state and roadmap” in 2009 defines the roadmap for research infrastructures. The roadmap consists of 20 projects for the roadmap of new infrastructures or ones that are to be significantly developed. Thirteen of them are associated with European researched infrastructures proposed by ESFRI. The roadmap includes twelve recommendations for developing infra-structures in specific disciplines are presented along with thirteen general recommendations concerning 1) the establishment of infrastructural entities and the improved utilization of infrastructures, 2) Finnish participation in international research infrastructures and ESFRI projects, 3) funding, and 4) research infrastructure policy.

The same roadmap estimates annual budgets for the development of research infrastructures. It is estimated that the additional costs of implementing the roadmap will total approximately €30 million per year, while the costs of current national and international research infrastructures are around €160 million a year. Funding will also be needed for local research infrastructures. The present project reiterates the proposals of earlier working groups concerning the need for an organ at the national level, a research infrastructure council, to prepare and implement research infrastructure policy and its funding.

“Research and Innovation Policy Guidelines for 2011–2015” of RIC states also that a new research infrastructure body is established that will prepare and implement a national and international infrastructure policy, which is in line with the ERI policy guidelines, and its evaluation and funding.

There is no dedicated hard or soft law governing funding organisations’ or research performers’ participation in bilateral or multilateral research programmes. However, ministries, agencies have established their own practices and programmes that increasingly allow cross-border access to RIs. Most recently also means for higher education institutions have been improved to allow cross-border access to RIs.

4.2 Getting good ideas to market

Improving access to finance

Several instruments supporting new R&D performing firms have existed in Finland for some time. One of them is the R&D project funding of Tekes that consists of grants and loans and plays an important role in the policy-mix. In the projects Tekes is responsible for half of the funding. One relevant shift (although not visible in the policy measures but their funding) is the increased fraction of R&D-funding allocated to SHOKs. This increase mirrors the efforts of focusing national strengths and top know-how to some key areas that are hoped to be competitive in global networks.

The MEE has established a Growth Enterprises group within the Enterprise and Innovation Department, which bears responsibility for structuring, developing and implementing the growth enterprise policy, as part of the broad-based innovation and industrial policy. The emphasis on growth enterprises has led to the establishment of [the VIGO accelerator programme](#) (launched by MEE in 2009) designed to complement the Finnish innovation ecosystem by bridging gaps between early stage technology firms and international venture funding. Through VIGO, target enterprises can gain access to both private and public funding sources. The programme is coordinated by Tekes. Other notable incubators aimed at supporting growth enterprises are, for example, [Startup Sauna](#), [the Spinno Enterprise Center](#) and [the Aalto Start-Up Center](#). There are various innovation platforms and incubators in many towns and cities around the country. Demola in Tampere is perhaps one of the best known. Hämeenlinna's counterpart is called Konseptori.

Tekes, on the other hand, has reformed its strategies and instruments aimed at better supporting new growth enterprises. In particular, project funding for businesses, according to [the new strategy](#), is channelled through different operating methods, which are:

- Around 40% for customer initiatives based on demand;
- Around 20% for research programmes of the Strategic Centres for Science, Technology and Innovation (SHOK);
- Around 25% to focus areas through Tekes programmes;
- Around 15% to other strategic choices.

Alongside Tekes, the Growth Company Service of [EnterpriseFinland](#) provides funding instruments to support SMEs. Additionally Finnvera (a specialised financing company owned by the State of Finland), VeraVenture (subsidiary of the former), Finnish Industry Investment and regional ELY-Centres all have instruments that support innovative start-ups. Most of these instruments are related to general funding support for businesses but in many cases these also target (innovative) start-ups.

Public sector financing support has also been directed towards seed-financing and loans. Finnvera plc, Sitra and Tekes represent public financing on equity terms. Seed financing is provided amongst others by Seed Fund Vera Ltd and the Finnish Industry Investment through the Financing Programme for Early Stage Companies. Tekes has a wide range of funding instruments to support innovation in businesses. Tekes provides for instance, funding for start-up businesses through the “Young Innovative Companies -programme”. Innovation is one of the key criteria for funding, as the firms operations have to be based on an innovative business

idea based on specific expertise or new technology. Another instrument launched by Tekes is the Funding for the purchase of innovation services that aims at promoting business development of innovative SMEs.

[The Nordic Growth Entrepreneurship Review 2012](#) reports that Finland nurtured 92 young growth enterprises in 2006–2009, whereas both Norway and Sweden were able to support over twice as many. The young growth company birth rate is 0.56% in Finland and 0.70% in Sweden. On the bright side, it seems that the Finnish growth enterprises grow faster and become larger than their Nordic peers. The same review also states that in the course of 2012–2013 Nokia, and to a lesser extent some other established businesses in the Finnish ICT sector, will release some ten thousand highly skilled individuals to the local labour market. Nokia has been very active in supporting the entrepreneurial efforts of those that leave the company. Depending on the case, it may offer to pay the individual's wage in excess of one year, even if the work continues at a start-up. Additionally it may provide tens of thousands of euros per company in direct support and loan guarantees. It may donate or sell patents and other forms of intellectual property to start-ups with plans to exploit them. MEE and other public organizations also have measures that are directly targeted at former Nokia employees. In the end of 2012, they had established some three hundred new businesses.

During 2013 there were two tax incentives introduced aimed at growth seeking businesses (see Section 2) and [the government agreement](#) on scaling up venture capital funding provide relevant instruments for developing growth entrepreneurship.

Protect and enhance the value of intellectual property and boosting creativity

IPR are covered namely by Trademarks Act, Trademarks decree, Patents Act and Design Right Act. Under the Trademarks Act, the sole right to a trademark as a special identifier may be registered for goods that are to be offered for sale or otherwise traded as part of business activity, in order to distinguish them from other goods and services. Design right protects goods or a part of its outward form. The National Board of Patents and Registration of Finland (PRH) promotes technical and economic development and intangible rights, both in Finland and internationally. The Finnish Business Information System (BIS) is an information processing system jointly maintained by the National Board of Patents and Registration and the Tax Administration which enables the required information to be submitted to both authorities with a single notification. The Ministry of Employment and the Economy's website has information about industrial property rights and innovation.

In 2012 the government [action plan for research innovation policy](#) referred also to the national IPR strategy that accounts for challenges related to the internationalisation of the operating environment; a new feature related to the competition over the geographical location of Enterprises consists of special incentives to do with the taxation of income obtained through the utilisation of the immaterial property rights of businesses. Indeed, [the Government budget for 2013](#) includes two tax incentives aimed at growth seeking businesses.

Public procurement

Prior to 2009 the role of innovation oriented public procurement was quite modest in Finland but the development of public procurement in research and innovation policies is underway and high on the political agenda. For instance the [Research and Innovation Policy Guidelines for 2011–2015 \(2010\)](#) places emphasis on public procurement by referring to it as one of the key tools of demand driven innovation policy. The development of public procurement is also one of the key themes in the action plan and [policy framework](#) for demand and user-driven

innovation. The main key barriers in implementing demand-side policies in Finland are the small domestic markets and to some extent the dispersed local government sector. As a result active participation of Finnish organisations to the [EU Lead Market](#) is seen as a very important approach in the action plan by the MEE. On the other hand the small markets can possibly work as an efficient pilot market for global innovations. [One of the Tekes programmes](#) also targets innovative public procurement since 2009. Its main aim is to encourage businesses to develop new innovations, renew public services, increase productivity, and to create new markets. An additional aim of the programme is to promote the use of public procurement as a tool for innovation policy as well as to develop good practices. [Action plan for research and innovation policy \(2012\)](#) discuss also possible new policy instruments related to innovation enhancing public procurements.

The above mentioned action plan refers also to the reform of the Act on Public Contracts, so that public procurements pay greater attention to innovation activity perspectives. A target level is set to directing one per cent of public procurement towards purchasing of new solutions in the cleantech field. The generation and diffusion of innovations is promoted by setting a target percentage (such as 2 or 3 per cent) for public procurement that enhances research, development and innovation activities. Expertise in procurement is enhanced by strengthening and developing comprehensive support and advisory services in matters of public procurement related to innovation. Financial and other incentives for procurement related to innovation are developed as part of the Effectiveness and Productivity Programme of central government and the productivity.

Innovation and research policy has been increasingly connected with societal issues (for example, globalisation, ageing, the environment and public health) that pose a challenge to growth and well-being. These challenges can be tackled with public sector innovation (or public procurement), growth entrepreneurship, service innovation as well as user and demand driven innovation. Tekes also has a specific programme “[Innovations in social and health care services 2008—2015](#)” targeting issues related to society and well-being.

4.3 Working in partnership to address societal challenges

The country has several hot-spot clusters in key technologies on a European and world scale, in particular in ICT, environment, materials, energy, security, and food and agriculture. By mid-2012, almost 1700 Finnish entities had participated in an FP7 project, with a total EC financial contribution of € 558 million and a success rate of 22.42 % (slightly above the EU average of 21.95 %).

There is no dedicated hard or soft law governing funding organisations’ or research performers’ participation in bilateral or multilateral research programmes. According to [NETWATCH](#) Finland has engaged, however, in i) 4 Article 169/185 initiatives including AAL JP, BONUS 169, EMRP and Eurostars, ii) 76 ERA-NETs and iii) 11 ERA-NET Plus. Finnish research organizations, companies and associations participate actively in EIPs, while the ministerial level engagement varies. In Raw Materials EIP Finland is represented in the High Level Steering Group by GTK, Geological Survey of Finland is in HLSC and in Sherpa, but there is no ministerial representation. Smart Cities and Communities EIP has VTT Technical Research Centre of Finland represented in the High Level Group. The level of activity has also been good Joint Technology Platforms (JTPs) and Joint Technology Initiatives (JTIs). Finland participates in the European research area ERA groups:

- ERA Committee ERAC

- Joint programming group GPC
- Steering Group for Human Resources and Mobility SGHRM
- Strategic Forum for International S&T Cooperation SFIC
- European Strategy Forum on Research Infrastructures ESFRI
- Knowledge Transfer group.

“Growth through expertise: Action plan for research and innovation policy” of RIC in 2012 initiates a national programme to ensure the best possible utilisation of EU’s research and innovation activities, such as the Horizon 2020 programme, as part of the efforts to promote the internationalisation of the research and innovation system. The national support and advisory service for the applicants of EU funding is renewed accordingly.

Research and Innovation Policy Guidelines for 2011–2015 of RIC plans that in addition to the EU, the partnerships to be prioritised within international cooperation include bilateral agreement countries in scientific and technological cooperation and the FinNode countries. The same guidelines set the objective for the engagement in EU funded research and innovation. “The share of EU funding of the entire research and innovation funding of universities and research institutes is doubled in the 2010s (5.8% in 2009).” The same guidelines articulate opening up national programmes and national funding. Programmes are opened up in a way that makes room for voluntary joint pilot projects of member states. Effective principles, procedures and criteria are sought and legislation is harmonised. Finland intends to participate in the most promising trials.

Strong research alliances exist with other Nordic countries, expanding into the Baltic region. In general, the Government provides strong support for bilateral agreements, support for common pots in exceptional cases. Research cooperation with areas adjacent to Finland Nordic cooperation is expanding to the Baltic states, arctic research, and cooperation with Russia. An organisation called NordForsk promotes cooperation among the Nordic countries. (Ministry of Education and Culture, 2013.)

Through the overall reform, research and analysis work in support of decision-making by the Government and its ministries will be strengthened by pooling research funding for deployment in line with government policy. For this purpose, among other initiatives, a strategic research funding instrument, a strategic research council, will be established. Research funding subject to competition, and disbursed in support of social policy and society’s functions and services, will be assembled under this instrument. This funding will be allocated to research aimed at finding solutions to the major challenges facing Finnish society and promoting imperatives such as the renewal of the country’s economic base, the improvement of its competitiveness, the development of working life and the enhancement of the public sector. Research and analysis activities supporting societal policy-making by the Government will also be strengthened.

4.4 Maximising social and territorial cohesion

The Regional Innovation Scoreboard 2012 accompanied by the “[Regional Innovation Scoreboard 2012 Methodology report](#)” covers four regions in Finland: Itä-Suomi (FI13), Etelä-Suomi (FI18), Länsi-Suomi (FI19), Pohjois-Suomi (FI1A), Åland (FI2). According to the scoreboard Finland is an innovation leader, but 2 Finnish regions lag behind in their innovation performance, in particular Åland (FI2) which is a moderate innovator. Finland has a mix of different types of regions, being the low user/absorber regions of most importance in both

periods (40%), together with full users/absorbers in the period 2000-06. Etelä-Suomi (FI18) is the only FP leading absorber region, whereas Itä-Suomi (FI13) became a SF leading user in the period 2007-13. In early 2014, thirteen regions take part in the S3 Platform of the European Commission.

For the Finnish government to attain the targets of regional development in Finland it has drawn up special programmes, of which the Centre of Expertise Programme (OSKE) is on-going. The government [action plan for research and innovation policy](#) foresees that regional cooperation will be intensified with [the INKA \(Innovative Cities\) programme](#) to be launched at the start of 2014 and which will replace OSKE. The programme encourages major urban areas in Finland to choose strategic focus areas and generate competence-driven business with the help of new kinds of development environments and lead markets. The aim is to use investments in development made by the state and the urban regions in order to generate openings that are based on international competence and also provide international visibility. Resources from structural funds from the period 2014–2020 are directed to comparable projects in innovation clusters. Major land use, housing and traffic infrastructure projects implemented in cities will be used as new types of development and testing environments for innovations. A region-specific negotiation procedure will be created for the most significant innovation clusters, with participation from national financiers, such as the Finnish Funding Agency for Technology and Innovation (Tekes), the Ministry of Employment and the Economy and, where necessary, the Ministry of Education and Culture and other ministries. [The growth agreement](#), also coordinated by the Ministry of Employment and the Economy, requires cities making choices in accordance with the Smart Specialisation Strategies of the European Union.

4.5 International Scientific Cooperation

Internationalisation of science has been a policy objective in Finland for quite some time, but so far the results of the policy measures have been modest. According to report on [the state of scientific research in Finland 2012](#) only 13% of the researchers in Finnish universities were foreigners. The same report also notes that co-publishing with foreign researchers has increased considerably since 1990; between 2006 and 2009 49% of scientific publications were co-published with foreign researchers. The share of foreign R&D-investment as a share of private R&D in Finland was 7% in 2010 (OECD, 2012), which is low in international comparison. In this light, it is not surprising that specific strategies for internationalisation have been designed for the higher education sector as well as for the Academy of Finland.

It has been noted that a particular challenge for Finland in its efforts to attract foreign talents relates to research and innovation environments and researcher salaries in the public and higher education sectors, which in many cases have not been competitive enough (Viljamaa et al., 2010). Many other countries have also invested more in developing national research infrastructures than Finland, for example, with concrete investment programmes (Viljamaa et al., 2010). The university reform addresses partly these challenges (see, Section 2).

Cooperation between countries is fostered by the European Framework Programme. By mid-2012, almost 1700 Finnish entities had participated in an FP7 project, with a total EC financial contribution of €558m and a success rate of 22.42 % (slightly above the EU average of 21.95 %) (Research and Innovation performance in Finland: Country Profile 2013). The share of participation of Finland in total participation is 1.9 % so far, and Finland has received 2.2 % of total EC contributions (European Commission, 2013). FP funding represents €128 per

inhabitant. The country also participates in Joint Programming. Finland participates as a member in nine initiatives. The country participates in five Article 185 initiatives and leads one of them.

The 2012 government [action plan for research and innovation policy](#) recognises that Finland has not utilised the opportunities offered by European and other international research funding to a sufficient degree. The same action plan requires systematic utilisation of international research funding. Finnish researchers' knowledge of the application process, their objectives and activity with reference to the research programmes of the European Union are not at a sufficient level.

Tekes has collaborative partnerships with several countries, such as the USA, Japan, China and European countries. [The FinNode Centres](#) (global network of Finnish innovation organisations operating via nodes in global innovation activity) in China, India, Japan, Russian and the USA are also valuable instruments for international cooperation.

5 NATIONAL PROGRESS TOWARDS REALISATION OF ERA

Based on analysis of the strengths and weakness of Europe's research systems and the overall objective of inducing lasting step-changes in Europe's research performance and effectiveness by 2014, [the European Commission has defined the following ERA priorities](#) (2012):

- More effective national research systems
- Optimal transnational co-operation and competition
- An open labour market for researchers
- Gender equality and gender mainstreaming in research
- Optimal circulation, access to and transfer of scientific knowledge.

While the Finnish R&I system has a long track-record in addressing these priorities strongly related with the challenges discussed earlier in this report, there also is a clear need to develop these areas further.

Finland has generally taken an active role in participating in the ERA. The European dimension is seen as a natural extension of the national policy for a small country with limited resources. In the report setting [the research and innovation policy guidelines for 2011-2015](#), the Research and Innovation Council stated that “Finland is a proactive and influential partner in the EU and in the initiatives of the European research and innovation policy, such as in deepening cooperation within national R&D programmes and promoting top-level European research”.

5.1 More effective national research systems

[The Finnish National Reform Programme \(2012\)](#) identified the most important substantive reforms of the research and innovation policy to be the creation and introduction of new means and models to strengthen innovation activity, the establishment of attractive clusters of expertise, internationalisation, structural development of higher education, reform of research institutes and research funding, and organisation of infrastructure policy and the tenure track system.

With regard to institutional funding, the on-going reform of the funding formula for universities and polytechnics aims at increasing the performance of Higher Education Institutions (HEIs) and addressing the fragmentation problem. The reform introduces more competition in the way institutional funding is allocated, since the research performance of the university is a component in the funding formula. Universities Act 558/2009 and related decrees on the reform of university funding model mean that institutional funding is allocated based on the research performance of the institution.

In September 2013 the Finnish Government approved resolution that specifies a package of measures for [the reform of research institutes and research funding](#). Through the funding reform, research and analysis work in support of decision-making by the government and its ministries will be strengthened by gathering together research funding for deployment in line with government policy. For this purpose, among other initiatives a strategic research funding instrument will be established. Research funding subject to competition, and disbursed in

support of social policy and society's functions and services, will be assembled under this instrument in order to make 70 million euros available for strategic research funding in 2017.

Research and analysis activities supporting societal decision-making by the Government will also be strengthened, by accumulating funding in stages from state research institutes' budget-funded research appropriations and placing it at the disposal of the government and its ministries. This will be accomplished between 2014-2016, making available €5m in 2014, €7.5m in 2015, and €12.5m in 2016 in non-earmarked funds, for research, assessment and analysis activities meeting the immediate information needs of the Government and its ministries.

Project-based funding by the Academy of Finland is allocated on a competitive basis and in line with the principles of peer review. The new overall reform of research funding will also affect the activities of the Academy of Finland. Through the reform, some 22% of direct government budget-funded research appropriations will be assembled and subjected to competition. Funding for applied R&D is also provided through calls for proposals by Tekes. One relevant initiative of competitive funding is the Strategic Centres for Science, Technology and Innovation (SHOK), which are cooperation platforms for innovative companies and spearheading research. The SHOKs are networks of a new type that engage in intensive and long-term work to achieve shared goals.

The issue of competitive versus institutional funding and the effectiveness of research funding were at the core of the recent international evaluations of the Academy of Finland and Tekes. These two evaluations took place in a context where reforms of the funding system for university and public research institutes are being implemented. Peer review practices have been fully integrated into research evaluations over a decade ago and are routinely used by the Academy of Finland for its project-based funding. Moreover, the 'independence' and 'international' components of peer review evaluation have been strengthened under the Research and Innovation Policy Guidelines. The peer review mechanism is not used for Tekes project-based funding.

With regard to the practices determining the core funding, Research and Innovation Policy Guidelines for 2011-2015 states that the independence and international scope of evaluations are strengthened. The independence of evaluations is strengthened with respect to the subject of the evaluation. Evaluations are international in scope. Evaluation results are more closely linked to the development and decision-making of organisations and functions. Furthermore, the funding for public research organisations is updated to increase their effectiveness through competitive funding allocation. The funding for research institutes is updated so that resources can be flexibly reallocated in accordance with the need for research-based evidence within society and for decision-making. The relatively high share of competitive public funding improves the system performance but may also lead to extensive administration. In general, estimations on the impact of the shift from core to competitive project-based funding on researchers' working conditions are not possible for the time being.

5.2 Optimal transnational co-operation and competition

There is no overarching legislation governing Finland's participation in joint initiatives. However, the Research and Innovation Policy Guidelines for 2011-2015 support the opening up of programmes for voluntary joint pilot projects of Member States. Given that Finland is a relatively small country, participating in cross-border joint initiatives has typically ranked high on the R&I agenda. Consequently, Finland is well represented in the European research landscape,

being a member of all major European research organisations (European Organisation for Nuclear Research, European Molecular Biology Laboratory, European Space Agency, European Organisation for Astronomical Research in the Southern Hemisphere, European Synchrotron Radiation Facility).

Cooperation between countries is fostered by the European Framework Programme. The share of participation of Finland in total participation is 1.9 % so far, and Finland has received 2.2 % of total EC contributions (European Commission, 2013). FP funding represents EUR 128 per inhabitant. The country also participates in Joint Programming. Finland participates as a member in nine initiatives. The country also participates in five Article 185 initiatives and leads one of them. By mid-2012, almost 1700 Finnish entities had participated in an FP7 project, with a total EC financial contribution of € 558 million and a success rate of 22.42 % (slightly above the EU average of 21.95 %) (Innovation Union Report 2013).

The 2012 government [action plan for research and innovation policy](#) recognises that Finland has not utilised the opportunities offered by European and other international research funding to a sufficient degree: “Finnish researchers’ knowledge of the application process, their objectives and activity with reference to the research programmes of the European Union are not at a sufficient level. Increasingly systematic utilisation of international research funding strengthens the preconditions for research and innovation activities and helps Finland develop its scientific expertise. A national programme to ensure the best possible utilisation of EU’s research and innovation activities, such as the Horizon 2020 programme, is created as part of the efforts to promote the internationalisation of the research and innovation system. The national support and advisory service for the applicants of EU funding is renewed accordingly.” Regarding the mutual recognition of evaluations based on international peer review, these are routinely performed as part of joint calls.

[The FinNode Centres](#) (global network of Finnish innovation organisations operating via nodes in global innovation activity) in China, India, Japan, Russian and the USA are also valuable instruments for international cooperation.

5.3 An open labour market for researchers

In 2010 the number of researchers (FTE) in relation to the labour force was 15.5 per 1 000 and the number of new doctoral graduates per thousand population aged 25-34 was 2.6. The shares of non-national doctoral candidates were 5.8% from another EU-27 Member State and 5.9% from non-EU countries. Persistent weaknesses in the Finnish research system for attracting researchers from abroad include limited career opportunities for researchers with few permanent positions and therefore a dependence on short term funding, the remuneration level has been lower than in many other European countries, families and especially spouses have had difficulties in getting a job, and the administration issues, for instance in universities, have also been seen as a challenge. There are rules and practices to help foreign researchers to work in Finland. Information is fragmented however and there has not been a dedicated programme to facilitate the immigration of foreign experts. Another issue has been the insufficient willingness of the private sector to recruit foreign researchers except for the few international businesses. In 2012, 56% of university-based researchers were satisfied with the extent to which research job vacancies are publicly advertised and made known by their institution (MORE2 Survey, 2012).

The Strategy for the Internationalisation of Higher Education Institutions in Finland (2009-2015) implements the principles of open, transparent and merit-based recruitment as laid down in the

Charter and Code. It should be noted that the Rectors' Council of the Finnish universities and the academy of Finland have signed up to the Charter and Code. Moreover, the steering of HEI's process and the 2012 agreement between national authorities and HEIs support the latter to prioritise and focus on improving research careers. Twelve Finnish organisations are actively engaged in the Commission's Human Resources Strategy for Researchers of which three have received the 'HR Excellence in Research' logo for their progress in implementing the Charter and Code. Moreover, soft law measures (e.g. Research and Innovation Policy Guidelines for 2011-2015 and [the FiDiPro programme](#)) further contribute to the opening up of the recruitment system with a view to attracting foreign researchers.

Grants are by and large open to non-domestic/foreign researchers and portable to other EU countries (e.g. Academy of Finland grants and fellowships), and the Academy of Finland has signed up to the Money Follows Researcher agreement. The Academy of Finland has a commitment to promoting the internationalisation of Finnish science and research by establishing bilateral agreements with countries and regions. For instance, the Academy of Finland provides funding for the [Finnish Centres for Excellences](#) (CoE) in order to support international cooperation in research.

The reform of the doctoral training system and the National Guidelines for the Development of Doctoral Training support the implementation of the principles of innovative doctoral training. The Strategy for the Internationalisation of Higher Education Institutions in Finland (2009-2015) facilitates the entry of foreign researchers and their access to research positions in Finland. Additionally Joint Degree Programmes have been initiated in Finnish universities to target foreign students aiming at Master's Degree level. So far the actions taken have not improved sufficiently the situation and therefore other policies or measures should be considered.

5.4 Gender equality and gender mainstreaming in research

In addition to the Equality Act which supports gender equality in HEIs and PROs, Finland has also adopted measures to support gender equality when decisions on research positions and research funding are made (Government Action Plan for Gender Equality (2012-2015) and Academy of Finland 'Criteria for research funding decisions'). As part of the steering of HEI's process and the 2012 agreement between national authorities and HEIs, the latter are required to report on the implementation of their gender equality strategies.

According to [a study](#) in 2009 the Government programmes and the Government Action Plans for Gender Equality have incorporated ambitious objectives for the promotion of gender equality in higher education and in the field of science. The objectives during the period of review have included dismantling segregation, reinforcing gender sensitivity in teacher education, promoting women's research careers, and establishing the status of women's studies. Based on the results of the study, university and science policy had included relatively few concrete measures that enable the integration of gender equality into all actions regarding higher education and science.

The long-standing gender equality work of the Academy of Finland has served as an example of how gender equality issues can be successfully integrated into activities. In 2011, more than 50% of the public sector research and development personnel were women (Academy of Finland, 2012).

5.5 Optimal circulation, access to and transfer of scientific knowledge including via digital ERA

The 2012 government [action plan for research and innovation policy](#) identifies the following action points in view of research and innovation information management.

- The public data resources may function as a raw material for research and innovation much more effectively than has been the case so far.
- The Ministry of Finance is about to launch an Open Data programme by which the public sector will expedite the opening and availability of data as concerns its own data resources.
- The action plan further notice that effective utilisation of public sector data in innovation activities requires the expedition of application and service development projects implemented by businesses, the strengthening of research, education and training and advisory services concerning the opening and utilisation of the data as well as new support services that can be used, among other things, to strengthen the innovation activities of communities utilising the open data and the development of data resources to be implemented in cooperation between public authorities and users.

The public-private partnerships are mainly facilitated through the Tekes R&D programmes as well as the Strategic Centres for Science, Technology and Innovation (SHOKs). Instead of being only a shareholder the private sector is also involved in planning the strategic research agenda for the research programmes coordinated by the SHOKs. The recent international evaluation of the Strategic Centres for Science, Technology and Innovation indicates that progress could have been faster.

Although Open Access-related measures have been adopted as early as 2005, there is no overall legislative provision supporting Open Access to publications and data. Open Access is not a mandatory funding criterion within the Academy of Finland funding programmes.

A national policy for the long term storage and reservation of data is not available yet, however recent measures such as the Open Data Programme and the Working group on Open Access to publications and research data as part of the National Research Data Project (ITA) specifically aim at addressing this issue.

Finland is member of eduGAIN through HAKA. FUNET is the Finnish National Research and Education Network (NREN), a specialised internet service provider dedicated to supporting the needs of the research and education communities within the country.

Finland has recently adopted two overarching policy measures supporting the development of digital research services (i.e. 'Putting data into use' and 'Roadmap for the utilisation of electronic data in research'). No overarching policy on electronic identity for researchers has been identified, although electronic identity is implemented.

Annex 1. Performance the national and regional research and innovation system

Feature	Assessment	Latest developments
1. Importance of the research and innovation policy	<p>(+) The development of R&I is considered crucial across the Government and the official target for GERD in 2020 is kept in 4%/GDP.</p> <p>(+) Research and innovation policies have been increasingly directed to address grand societal challenges and contribute to diversification and economic growth.</p>	<p>Structural reforms of funding agencies, research institutes and universities have advanced efficiently creating relevant mergers and further coordination that are together with new funding models expected to streamline and direct the R&I system appropriately.</p>
2. Design and implementation of research and innovation policies	<p>(+) The design and implementation of R&I policy is governed in a coordinated manner across the ministries and the key public agencies.</p> <p>(-) The R&I policy system had become complex and fragmented and suffered from excessive emphasis on supply side measures. Also the business support system had become excessively complex to both access and administer.</p> <p>(+/-) Structural reforms of funding agencies, research institutes and universities have advanced efficiently creating relevant mergers and further coordination that are planned together with new funding models to streamline and direct the R&I system appropriately. However, diverging views on the benefits of the reform exist.</p> <p>(+) External institutional evaluation is a common practice that provides orientation for policy.</p>	<p>The 'Research and Innovation Policy Guidelines for 2011-2015' (Research and Innovation Council) and the 'Growth through expertise, Action plan for research and innovation policy' are two key policy documents which set out at national level the policy guidelines on the required measures.</p> <p>The latest Government decision on central government spending limits for 2014 – 2017 sets the long-term budgetary plans for R&I policy.</p> <p>The Finnish Research Infrastructure Committee updated Finland's national roadmap for infrastructures in 2013.</p> <p>In 2012, ICT 2015 working group was appointed to prepare a strategy to mitigate the effects of the sudden structural change.</p>
3. Innovation policy	<p>(+) Research and Innovation Council, Tekes and MEE address integration of innovation policy and supply side measures in policy.</p> <p>(+) The coordination of R&I policy across the Government sectors is an established practice.</p> <p>(+) Research and innovation policies have been increasingly directed to address grand societal challenges and to contribute to economic diversification and growth. This has supported the integration of R&I in other policy sectors.</p>	<p>The 'Research and Innovation Policy Guidelines for 2011-2015' (Research and Innovation Council) and the 'Growth through expertise, Action plan for research and innovation policy' are two key policy documents which set out at national level the policy guidelines on the required measures integrating innovation across the sectoral policies.</p> <p>The action plan and policy framework for demand and user-driven innovation by MEE.</p> <p>The reform of the Act on Public Contracts, so that public procurements pay greater attention to innovation.</p>
4. Intensity and predictability of the public investment in	<p>(+) The development of R&I is considered crucial across the Government and the official target for GERD in 2020 is kept in 4%/GDP.</p>	<p>The 'Research and Innovation Policy Guidelines for 2011-2015' (Research and Innovation Council) and the 'Growth through expertise, Action plan for</p>

research and innovation	<p>(+) The design and implementation of R&I policy is governed in a coordinated manner across the ministries and the key public agencies.</p> <p>(-) Greater emphasis on competitive funding reduces the predictability of long term funding at the level of research organisations.</p>	<p>research and innovation policy’ are two key policy documents which set out at national level the policy guidelines on the required measures.</p> <p>The latest Government decision on central government spending limits for 2014 – 2017 sets the long-term budgetary plans for R&I policy.</p> <p>New funding models of research institutes and universities</p>
5. Excellence as a key criterion for research and education policy	<p>(+/-) Structural reforms of funding agencies, research institutes and universities have advanced efficiently creating relevant mergers and further coordination that are expected to support together with more excellence driven funding models increase in the quality of scientific research. However, diverging views on the benefits of the reform exist.</p> <p>(-) Greater emphasis on competitive funding, however, reduces the predictability of long term funding at the level of research organisations and deteriorate the conditions in particular for basic research. New measures to support basic research are developed to address the challenge.</p>	<p>Reform of research institutes and research funding (2013) as well as new funding model for universities are meant to drive for excellence</p> <p>Research and Innovation Policy Guidelines for 2011–2015 and institutional evaluations call for excellence.</p> <p>Strategic Centres for Science, Technology and Innovation (SHOKs) evaluation (2013) included excellence criterion</p>
6. Education and training systems	<p>(+) Structural reforms of universities and polytechnics have advanced efficiently creating relevant mergers and further coordination that together with the new funding model are designed to improve the education and training systems.</p> <p>(+) The university reform improves completion of studies, accelerates the transition to working life, boost the quality and internationalisation of teaching and research, and strengthens the specialisation of higher education institutions.</p>	<p>The university reform (with the new University Act in 2010) has also increased the autonomy of universities, making them autonomous legal entities. This has been followed by mergers of several universities decreasing the amount of universities to 16.</p> <p>Also a new university funding model and reform with an attempt to lay greater emphasis on quality came into force in January 2013.</p> <p>Universities have also introduced a tenure track as the core academic career system to offer well-supported career path.</p> <p>The new Polytechnics Act will take force from 2014. Polytechnics will be made independent legal entities.</p>
7. Partnerships between higher education institutes, research centres and businesses, at regional, national and international level	<p>(+) Collaboration between research and business has been actively promoted since 1980s especially by Tekes programmes. More recently establishing long-lasting partnerships have been considered important for R&I; for instance, Strategic Centres for Science, Technology and Innovation (SHOKs).</p> <p>(+) Given that Finland is a relatively small country, internationalisation and participating in cross-border joint initiatives and</p>	<p>One objective of the reform of research institutes greater cooperation between research institutes and universities.</p> <p>The networking activities have begun under the framework of the Finnish Natural Resource and Environmental Research Consortium (LYNET) and the Consortium of Expert Institutions on Health and Welfare (SOTERKO).</p>

	<p>partnerships have typically ranked high on the R&I agenda.</p> <p>(+) Increased collaboration and coordination of public agencies and opening up and streamlining of instruments provide new opportunities for regional, national and international partnerships.</p>	<p>Finland has engaged in i) 4 Article 169/185 initiatives including AAL JP, BONUS 169, EMRP and Eurostars, ii) 76 ERA-NETs and iii) 11 ERA-NET Plus (NETWATCH, 2013).</p> <p>Finnish research organizations, companies and associations participate also actively in EIPs, while the ministerial level engagement varies.</p> <p>The level of activity has also been good in Joint Technology Platforms (JTPs) and Joint Technology Initiatives (JTIs).</p>
8. Framework conditions promote business investment in R&D, entrepreneurship and innovation	<p>(+) The focus of public R&D&I funding has been effectively shifted to SMEs which are growth-oriented, job creating and are successfully establishing international connections.</p> <p>(+) Structural reforms of funding agencies and further coordination are expected to support together with new funding models increase in the diversification and growth businesses.</p>	<p>A new joint-service 'Growth Track' intended for enterprises aiming at rapid growth and internationalisation</p> <p>The introduction by Tekes of a programme for funding young, innovative companies</p> <p>The renewal of Finnvera's export guarantees schemes</p> <p>The expansion of the Vigo Accelerator Programme</p> <p>The Tax Incentive for Private Investors targets business angels investing equity in SMEs</p> <p>The R&D Tax Credit for SMEs is a deduction from corporate income taxes tied to the wage costs of R&D personnel</p> <p>IPR Box providing a lower corporate tax rate on revenues coming from intellectual property rights (IPRs).</p> <p>Government decision on central government spending limits for 2014 – 2017 in April 2013</p> <p>Tekes, the new strategy with emphasis on growth companies.</p> <p>University and polytechnics reforms stress more emphasis on entrepreneurial skills and innovation.</p>
9. Public support to research and innovation in businesses is simple, easy to access, and high quality	<p>(-) In terms of policy and the functioning of the research and innovation system, policy has sought to cater for the needs of a wide spectrum of potential users who operate under a range of circumstances. As a result, the business support system has become excessively complex to both access and administer.</p> <p>(+) The clarification of the roles of different</p>	<p>In accordance with the Government Programme, risk-taking of Finnvera will be increased.</p> <p>In spring 2013, the Government decided to launch a long-term growth-funding programme with view to strengthening investment markets and to support small and mid-sized companies.</p>

	<p>government agencies, for instance those of Tekes and Finvera and the development of new services for businesses clarify the situation.</p>	<p>Tekes, on the other hand, has reformed its strategies and instruments aimed at better supporting new growth enterprises.</p> <p>Alongside Tekes, the Growth Company Service of EnterpriseFinland provides funding instruments to support SMEs.</p>
<p>10. The public sector itself is a driver of innovation</p>	<p>(-) Traditionally boosting innovation through public procurement has not received sufficient attention.</p> <p>(+) Innovation and research policy has been increasingly connected with societal issues (for example, globalisation, ageing, the environment and public health) that pose a challenge to growth and well being. These challenges can be tackled with public sector innovation (or public procurement), growth entrepreneurship, service innovation as well as user and demand driven innovation.</p> <p>(+) Innovation policy becoming truly horizontal also public procurement is step-by-step taking into account opportunities to foster innovation activities.</p> <p>(+) The generation and diffusion of innovations is promoted by setting target percentages for public procurement that enhances research, development and innovation activities. Expertise in procurement is enhanced by strengthening and developing comprehensive support and advisory services in matters of public procurement related to innovation.</p> <p>(+) In 2012, Growth through expertise: Action plan for research and innovation policy by RIC set a measure that supports the programme on the opening of public data and measures to promote business use of public sector information, education and training, advisory, networking and other support services.</p> <p>(+) The same action plan states that shared use of information and openness are promoted by investing in the information infrastructure of managing, distributing and storing digital data related to research and innovation.</p>	<p>Action plan for research and innovation policy (2012) discusses also possible new policy instruments related to innovation enhancing public procurements. The action plan refers also to the reform of the Act on Public Contracts, so that public procurements pay greater attention to innovation activity perspectives.</p> <p>Financial and other incentives for procurement related to innovation are developed as part of the Effectiveness and Productivity Programme of central government and the productivity.</p> <p>One of the Tekes programmes also targets innovative public procurement since 2009. Its main aim is to encourage businesses to develop new innovations, renew public services, increase productivity, and to create new markets. An additional aim of the programme is to promote the use of public procurement as a tool for innovation policy as well as to develop good practices.</p>

Annex 2. National Progress on Innovation Union commitments

		Main changes	Brief assessment of progress / achievements
1	Member State Strategies for Researchers' Training and Employment Conditions	<p>(+) Signature of the 'European Charter for Researchers' and the 'Code of Conduct for the Recruitment of Researchers' by the Rectors' Council of the Finnish universities and the Academy of Finland</p> <p>(+) The 'National Guidelines for the Development of Doctoral Training' (2011) have been prepared for the universities.</p> <p>(+) Strategy for the Internationalisation of Higher Education Institutions in Finland until 2015 orients the recruitment processes in higher education institutions.</p>	<p>(+) National legislation offers code on research practice and national bodies advise on practice and misconduct.</p> <p>(+) Agreement exists between national authorities and HEIs that highlights the key priorities to be implemented by HEIs.</p> <p>(+) Ministries, agencies, research institutes and universities have established their own practices.</p> <p>(+) Since 2011, all Finnish universities have started the reform of the doctoral training system in line with the principles of innovative doctoral training.</p> <p>(-) No major improvements in the share of foreign researchers or in the mobility of either students or staff at Finnish HEIs.</p> <p>(-) insufficient willingness of the private sector to recruit foreign researchers except for the few international businesses.</p>
4	ERA Framework		
5	Priority European Research Infrastructures	<p>(+) "Growth through expertise: Action plan for research and innovation policy" of RIC in 2012 launched a measure that allocates funding for research infrastructure.</p> <p>(+) It is estimated that the additional costs of implementing the roadmap will total approximately €30 million per year, while the costs of current national and international research infrastructures are around €160 million a year.</p> <p>(+) The FIRI Committee (Finnish Research Infrastructure Committee) prepares the update of the national roadmap for infrastructures during the year 2013.</p>	<p>(+) Ministries, agencies have established their own practices and programmes and budget that increasingly allow cross-border access to RIs. Most recently also means for higher education institutions have been improved to allow cross-border access to RIs.</p>
7	SME Involvement	<p>(+) EU Research and Innovation Programmes (EUTP), based in</p>	<p>(+) Finland was one of the member states responsible for establishing the</p>

		<p>Tekes, communicates EU funding opportunities and EU policy issues to all Finnish stakeholders in companies, universities, research institutes, governmental agencies and municipalities. It also monitors the EU project landscape and Finnish participation.</p> <p>(+) Tekes is responsible for the coordination of EUREKA activities and as a result, the national EUREKA Office is an integral part of Tekes. Tekes is also the main funding body of Finnish EUREKA participants.</p> <p>(+) Eurostars projects are funded by national agencies and the European commission together. Tekes funds Finnish project participants annually with EUR 5 million. Besides funding Eurostars offers companies expertise to complete R&D projects.</p>	<p>EUREKA Initiative in 1985 and is today active member of EUREKA and Eurostars.</p> <p>(+) Tekes supports SME engagement in H2020 through EUTI.</p>
11	Venture Capital Funds	<p>The Government budget for 2013 includes two tax incentives aimed at growth seeking businesses. Action plan for research and innovation policy (2012) discuss also possible new policy instruments related to venture capital funds.</p> <p>(+) 2013 includes two tax incentives aimed at growth seeking businesses and the government agreement on scaling up venture capital funding provide relevant instruments.</p> <p>(+) The Tax Incentive for Private Investors targets business angels investing equity in SMEs</p> <p>(+) A new joint-service 'Growth Track' intended for enterprises aiming at rapid growth and internationalisation</p> <p>(+) Tekes has reformed its strategies and instruments aimed at better supporting new growth enterprises and SMEs. The introduction by Tekes of a programme for funding young, innovative companies</p> <p>(+) The renewal of Finnvera's</p>	<p>(+) Structural reforms of funding agencies and further coordination are expected to support together with new funding models increase funding opportunities for growth businesses.</p> <p>(+) The focus of public R&D&I funding has been effectively shifted to SMEs which are growth-oriented. Despite major efforts and resource allocations it is still premature to assess the success of these changes.</p>

		export guarantees schemes (+) The expansion of the Vigo Accelerator Programme	
13	Review of the State Aid Framework	(+) Tekes has reformed its strategies and instruments aimed at better supporting new innovative growth enterprises. (+) The regional cooperation will be intensified with the INKA (Innovative Cities) programme to be launched at the start of 2014. (+) Evaluation of Tekes (2012), SHOKs (2013) and the Academy of Finland Evaluation (2013) (+) the evaluation of the effectiveness of the Research and Innovation Council will be published in March 2014.	(+) To support the ongoing reform of the national R&I system a number of international studies and evaluations have been conducted and their recommendations have systematically oriented the policy and the strategy formulation of the Ministries and their agencies.
14	EU Patent	(+) Participation in the enhanced cooperation on the unitary patent protection (+) Signature of the Agreement on a Unified Patent Court (2013)	(+) Participation in the enhanced cooperation on the unitary patent protection (+/-) Signature of the Agreement on a Unified Patent Court in Feb 2013, not ratified by Jan 2014.
15	Screening of Regulatory Framework	(+) In 2011, a working party to monitor the business impact assessment of new and amended legislation, set up by the Ministry of the Employment and the Economy (MEE), made proposals to improve regulatory business impact assessment including impacts on innovation activities. (+) In 2012, ICT 2015 working group was appointed to prepare a strategy to mitigate the effects of the sudden structural change in the ICT sector as well as to reform the information and communications technology sector and to increase its competitiveness. The working group proposes, for instance, a ten-year research, development and innovation programme and a new financing programme to ensure sufficient funds for start-ups and companies in the growth phase.	(-) In Finland it is a standard practice to assess regulatory framework in the process of developing new legislation. However, more proactive screening of regulatory framework and its implications on R&I could be conducted.
17	Public Procurement	(+) Action plan for research and innovation policy (2012) introduces new policy instruments related to innovation enhancing public procurements.	(+) The reform of the Act on Public Contracts, so that public procurements pay greater attention to innovation activity perspectives.

		<p>(+) Financial and other incentives for procurement related to innovation are developed as part of the Effectiveness and Productivity Programme of central government and the productivity.</p> <p>(+) The public procurement has increased during recent years.</p>	<p>(+) Expertise in procurement is enhanced by strengthening and developing comprehensive support and advisory services in matters of public procurement related to innovation.</p>
20	Open Access	<p>(+) The Open Data Programme of the Ministry of Finance was launched in autumn 2012.</p> <p>(+) As part of the programme, a joint project of local and central government will be launched to establish an open metadata service and related support services.</p> <p>(+) CSC - IT Centre For Science Ltd provides wide selection of digital research services (scientific software, databases) to academia, research institutes and businesses.</p>	<p>(+) The Ministry of Education officially supports Open Access of science by recommending it to everybody in Finnish scientific institutions and by funding it.</p> <p>(-) Although Open Access-related measures have been adopted as early as 2005, there is no overall legislative provision supporting Open Access to publications and data. Open Access is not a mandatory funding criterion within the Academy of Finland funding programmes.</p>
21	Knowledge Transfer	<p>(+) The focus of public R&D&I funding has been effectively shifted to SMEs capable to generate fast growing business opportunities based on research or other competences.</p> <p>(+) Evaluation of strategic centres for science, technology and innovation (2013)</p>	<p>(+) Advanced mechanisms of knowledge transfer in place.</p> <p>(+) Structural reforms of funding agencies and further coordination are expected to support together with new funding models increased knowledge transfer.</p>
22	European Knowledge Market for Patents and Licensing	<p>(+) The Government budget for 2013 includes two tax incentives aimed at growth seeking businesses.</p> <p>(+) Action plan for research and innovation policy (2012) discuss also possible new policy instruments related to venture capital funds, lowering of corporate tax rate on revenues coming from intellectual property rights (IPRs)</p>	<p>(+) The development of knowledge market of a small country is strongly connected with the international developments. Finland is actively engaged in European and international coordination.</p> <p>(-) In addition to the international developments, more emphasis on national markets could have been stressed.</p>
23	Safeguarding Intellectual Property Rights	<p>IPR are covered namely by Trademarks Act, Trademarks decree, Patents Act and Design Right Act.</p>	<p>(+) IPR are covered namely by Trademarks Act, Trademarks decree, Patents Act and Design Right Act.</p> <p>(+) The National Board of Patents and Registration of Finland (PRH) promotes technical and economic development and intangible rights, both in Finland and internationally.</p>

24	Structural Funds and Smart Specialisation	<p>(+) The regional cooperation will be intensified with the INKA (Innovative Cities) programme to be launched at the start of 2014.</p> <p>(+) Four regions participate in the S3 Platform of the European Commission.</p> <p>(+) The growth agreement, also coordinated by the Ministry of Employment and the Economy, requires cities making choices in accordance with the Smart Specialisation Strategies of the European Union.</p>	<p>(+) Resources from structural funds from the period 2014–2020 will be directed to comparable projects in innovation clusters.</p>
25	Post 2013 Structural Fund Programmes	<p>(+) Resources from structural funds from the period 2014–2020 are directed to comparable projects in innovation clusters.</p>	<p>(+) For the next period of the EU Structural Funds 2014–2020, research and innovation are among the priorities. In Finland, the focus is expected to be on enhancing infrastructure and capacities, promoting business R&I investment and a range of innovative actions through smart specialisation as well as supporting technological and applied research, pilot lines and early product validation.</p>
26	European Social Innovation pilot	<p>(+) Finland's Innovation Fund (Sitra) conducted research and development on social innovation (The Open Book of Social Innovation).</p>	<p>(+) The most significant social achievement and strength of Finland's society is its free general education, small income disparities, little poverty and the wide participation of women in working life.</p> <p>(-) Finland no clear development strategy for social innovation was not identified in this study.</p>
27	Public Innovation Sector	<p>(+) In 2012, Growth through expertise: Action plan for research and innovation policy by RIC set a measure that supports the programme on the opening of public data and measures to promote business use of public sector information, education and training, advisory, networking and other support services.</p> <p>(+) The same action plan states that shared use of information and openness are promoted by investing in the information infrastructure of managing, distributing and storing digital data related to research and innovation.</p>	<p>(+) To support the programme on the opening of public data and measures to promote business use of public sector information, education and training, advisory, networking and other support services are compiled into a single entity.</p> <p>(+) Innovation and research policy has been increasingly connected with societal issues that pose a challenge to growth and well-being. These challenges can be tackled with public sector innovation.</p>
29	European Innovation Partnerships	<p>(+) Finnish research organizations, companies and associations have become active in EIPs.</p>	<p>(+) Finnish research organizations, companies and associations have been active in EIPs.</p>

30	Integrated Policies to Attract the Best Researchers	<p>(+) Research and Innovation Policy Guidelines for 2011–2015 defines a measure to attract international students, researchers and experts.</p> <p>(+) Opening up of programmes and attracting international students and researchers.</p> <p>(+) Strategy for the Internationalisation of Higher Education Institutions in Finland 2009–2015</p> <p>The FiDiPro –programme is one of the tools established in Finland to tackle the issue of attracting talent from abroad alongside the rather new four-tier career model.</p> <p>(+) The Ministry of Education will increase its annual appropriation to the Fulbright Center by 50% from 2010.</p> <p>(+) The Academy of Finland has signed the Money Follows Researcher (MFR) agreement, the initiative of the late European Heads of Research Councils (EUROHORCS).</p> <p>(+) Joint Degree Programmes have been initiated in Finnish universities to target foreign students aiming at Master's Degree level.</p> <p>(+) National grants or fellowships by the Academy of Finland are open equally to all nationalities subject to the research conducted being to the benefit of Finland to some extent.</p>	<p>(+) The recruitment practices of higher education institutions and research institutes are changed to attract international students, researchers and experts. It includes a measure to enhance access to research funding of American researchers in Finland.</p> <p>(-) Still, there is no overarching legislation governing Finland's participation in joint initiatives.</p> <p>(+) Ministries, agencies have established their own practices and programmes that increasingly allow cross-border access to RIs.</p> <p>(+/-) There are rules and practices to help foreign researchers and their families in Finland but efforts have not been sufficient.</p>
31	Scientific Cooperation with Third Countries	<p>(+) The Academy of Finland and Tekes have collaborative partnerships with several countries; Tekes, for instance, the USA, Japan, China and European countries.</p> <p>The FinNode Centres (global network of Finnish innovation organisations operating via nodes in global innovation activity) in China, India, Japan, Russian and the USA are also valuable instruments for international cooperation.</p>	<p>(+) Coordination of international R&I cooperation has improved through the FinNode network.</p> <p>(-) The Academy of Finland needs to develop its internationalisation strategy.</p>

32	Global Research Infrastructures	<p>(+) Active engagement in European research infrastructure organisations many with global reach.</p> <p>(+) Global science forums include organisations subordinate to UNESCO and OECD committees and working groups.</p>	(+) Finland as a small country has taken active role in the participation in international research infrastructures.
33	National Reform Programmes	(+) The National Reform Programme 2013 intends to diversify the business structure, in particular by hastening the introduction of planned measures to broaden the innovation base.	(+) The National Reform Programme 2013 intends to diversify the business structure, in particular by hastening the introduction of planned measures to broaden the innovation base. In particular, the programme notes that in order to accelerate economic growth in 2013 and 2014, a tax incentive for research and development activities, double depreciation right as well as tax relief for investments in 2013–2015 will be utilised.

Annex 3. National Progress Towards Realisation Of Era

ERA Priority	ERA Action	Recent changes	Assessment of progress in delivering ERA
1. More effective national research systems	Action 1: Introduce or enhance competitive funding through calls for proposals and institutional assessments	Universities Act 558/2009 and related decrees on the reform of university funding model Reform of public research institutes (incl. their funding model) International evaluation of the Academy of Finland International evaluation of TEKES & SHOKs	(+) Competitive funding is widely applied and its share is increasing. (+) Institutional assessment and evaluation are routine practices.
	Action 2: Ensure that all public bodies responsible for allocating research funds apply the core principles of international peer review	Research and Innovation Policy Guidelines for 2011–2015 Growth through expertise, Action plan for research and innovation policy	(+) Peer review practices have been fully integrated into research evaluations over a decade ago and are routinely used by the Academy of Finland for its project-based funding. (-) The peer review mechanism is not used for TEKES project-based funding.
2. Optimal transnational co-operation and competition	Action 1: Step up efforts to implement joint research agendas addressing grand challenges, sharing information about activities in agreed priority areas, ensuring that adequate national funding is committed and strategically aligned at European level in these areas	Research and Innovation Policy Guidelines for 2011–2015 addresses the opening up of programmes for voluntary joint projects. Finland has engaged in i) 4 Article 169/185 initiatives including AAL JP, BONUS 169, EMRP and Eurostars, ii) 76 ERA-NETs and iii) 11 ERA-NET Plus (NETWATCH, 2013). Finnish research organizations, companies and associations participate also actively in EIPs, while the ministerial level engagement varies. The level of activity has also been good in Joint Technology Platforms (JTPs) and Joint Technology Initiatives (JTIs).	(-/+) There is no overarching legislation governing Finland's participation in joint initiatives. Ministries, agencies have established their own practices and programmes that increasingly allow cross-border access to RIs. (+) Increased collaboration and coordination of public agencies and opening up and streamlining of instruments provide new opportunities for regional, national and international partnerships.
	Action 2: Ensure mutual recognition of evaluations that conform to international peer-review standards as a basis for national funding decisions	Finland has participated actively in developing common practices of evaluation.	(+) International joint programmes and bilateral agreements of Tekes and Academy of Finland.

	Action 3: Remove legal and other barriers to the cross-border interoperability of national programmes to permit joint financing of actions including cooperation with non-EU countries where relevant	Research and Innovation Policy Guidelines for 2011–2015 supports the opening up of programmes, effective principles, procedures and criteria are sought and legislation is harmonised.	(-/+) There is no overarching legislation governing Finland's participation in joint initiatives. Ministries, agencies have established their own practices and programmes that increasingly allow cross-border access to RIs.
	Action 4: Confirm financial commitments for the construction and operation of ESFRI, global, national and regional RIs of pan-European interest, particularly when developing national roadmaps and the next SF programmes	Update of the FIRI Committee (Finnish Research Infrastructure Committee) national roadmap for infrastructures in 2013 Growth through expertise: Action plan for research and innovation policy states the allocation of annual funding for research infrastructures.	(+) Finland has taken active role in RI development and participates actively in ESFRI.
	Action 5: Remove legal and other barriers to cross-border access to RIs	Research and Innovation Policy Guidelines for 2011–2015 sets up of a research infrastructure body in charge of preparing and implementing a national and international infrastructure policy.	(-/+) There is no overarching legislation governing Finland's participation in joint initiatives. Ministries, agencies have established their own practices and programmes that increasingly allow cross-border access to RIs.
ERA priority 3: An open labour market for researchers	Action 1: Remove legal and other barriers to the application of open, transparent and merit based recruitment of researchers	Strategy for the Internationalisation of Higher Education Institutions in Finland 2009–2015 contributes to the implementation by HEIs of the principles for the recruitment of researchers as defined in the Charter and Code. Research and Innovation Policy Guidelines for 2011–2015 states changes to the recruitment practices of higher education institutions and research institutes in order to attract international researchers and thus contributes to open recruitment. Finland Distinguished Professor Programme (FiDiPro) contributes to the opening up of recruitment of foreign researchers.	(-) So far the actions taken have not improved sufficiently the situation and therefore other policies or measures should be considered.

	Action 2: Remove legal and other barriers which hamper cross-border access to and portability of national grants	<p>The Money Follows Researcher (MFR) agreement signed by the Academy of Finland supports portability of grants.</p> <p>Strategy for the Internationalisation of Higher Education Institutions in Finland 2009–2015 orients the recruitment processes in higher education institutions.</p>	(+/-) Academy of Finland grants and fellowships: These grants are portable to other EU countries. However, administrative barriers to their portability persist. These grants are open to foreign/non-domestic researchers subject to the research being conducted in the interest of the country.
	Action 3: Support implementation of the Declaration of Commitment to provide coordinated personalised information and services to researchers through the pan-European EURAXESS3 network	EURAXESS Finland contributes to the implementation of the Euraxess services.	(+/-) While the EURAXESS Finland is in place, its content and dissemination could be improved.
	Action 4: Support the setting up and running of structured innovative doctoral training programmes applying the Principles for Innovative Doctoral Training.	National Guidelines for the Development of Doctoral Training supports the implementation of the principles for innovative doctoral training.	(+) Structured innovative doctoral training is in place.
	Action 5: Create an enabling framework for the implementation of the HR Strategy for Researchers incorporating the Charter & Code	<p>Signature of the 'European Charter for Researchers' and the 'Code of Conduct for the Recruitment of Researchers by the Rectors' Council of the Finnish universities and the Academy of Finland</p> <p>Strategy for the Internationalisation of Higher Education Institutions in Finland 2009-2015 implements the principles of the Charter and Code amongst HEI and facilitates the entry of foreign researchers and their access to research positions.</p>	(+) Agreement exists between national authorities and HEIs that highlights the key priorities to be implemented by HEIs.
ERA priority 4: Gender equality and gender mainstreaming in research	Action 1: Create a legal and policy environment and provide incentives	Government Action Plan for Gender Equality 2012-2015 supports gender equality efforts in HEIs, incl. monitoring of gender equality plans.	(+) According to the Equality Act HEIs and PROs are required by law to draw up and implement equality plans.

	Action 2: Engage in partnerships with funding agencies, research organisations and universities to foster cultural and institutional change on gender	Academy of Finland Equality Plan requires that gender equality is taken into consideration when decisions regarding research positions and research funding are made.	(+) Academy of Finland 'Criteria for research funding decision' supports female researchers' career and gender equality in science.
	Action 3: Ensure that at least 40% of the under-represented sex participate in committees involved in recruitment/career progression and in establishing and evaluating	No information identified of such quota.	(+/-) In Finland, there are plenty of female researchers, also in leading positions. However, gender balance in research is not legislated.
ERA priority 5: Optimal circulation, access to and transfer of scientific knowledge including via digital ERA	Action 1: Define and coordinate their policies on access to and preservation of scientific information	Open Data Programme (2013) supports open access to scientific information, incl. open metadata service and related support services. National Digital Library the availability and use of electronic material of libraries, archives and museums (incl. scientific data). Working group on Open Access to publications and research data as part of the National Research Data Project (TTA) supports research data storage and reservation and use of data.	(+/-) Although Open Access-related measures have been adopted as early as 2005, there is no overall legislative provision supporting Open Access to publications and data. Open Access is not a mandatory funding criterion within the Academy of Finland funding programmes.
	Action 2: Ensure that public research contributes to Open Innovation and foster knowledge transfer between public and private sectors through national knowledge transfer strategies	Working group on Open Access to publications and research data as part of the National Research Data Project (TTA) supports research data storage and reservation and use of data.	(+) Along the further access to public data more and more attention is given in support of its proper use.
	Action 3: Harmonise access and usage policies for research and education-related public e-infrastructures and for associated digital research services enabling consortia of different types of public and private partners	Growth through expertise: Action plan for research and innovation policy states support to infrastructure for storing and managing digital research and innovation data. Putting data into use: Roadmap for the utilisation of electronic data in research (2011) supports the development of digital research services.	A national policy for the long term storage and reservation of data is not available yet, however recent measures such as the Open Data Programme and the Working group on Open Access to publications and research data as part of the National Research Data Project (TTA) specifically aim at addressing this issue.

		<p>CSC – IT Centre For Science Ltd provides wide selection of digital research services (scientific software, databases) to academia, research institutes and businesses.</p>	
	<p>Action 4: Adopt and implement national strategies for electronic identity for researchers giving them transnational access to digital research services</p>	<p>Finland is member of eduGAIN through HAKA.</p> <p>FUNET is the Finnish National Research and Education Network (NREN), a specialised internet service provider dedicated to supporting the needs of the research and education communities within the country.</p> <p>Finland has recently adopted two overarching policy measures supporting the development of digital research services (i.e. 'Putting data into use' and 'Roadmap for the utilisation of electronic data in research').</p>	<p>(+) Finland is member of eduGAIN through HAKA.</p> <p>(-) No overarching policy on electronic identity for researchers has been identified, although electronic identity is implemented.</p>

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LIST OF ABBREVIATIONS

BERD	Business Expenditures for Research and Development
CERN	European Organisation for Nuclear Research
CoE	Centres of Excellence
COST	European Cooperation in Science and Technology
EMBL	European Molecular Biology Laboratory
EPO	European Patent Office
ERA	European Research Area
ERA-NET	European Research Area Network
ERDF	European Regional Development Fund
ERP Fund	<u>European Recovery Programme Fund</u>
ESA	European Space Agency
ESFRI	European Strategy Forum on Research Infrastructures
ESO	European Organisation for Astronomical Research in the Southern Hemisphere
ESRF	European Synchrotron Radiation Facility
ETP	European Technology Platform
EU	European Union
FP	<u>European Framework Programme for Research and Technology Development</u>
EU-27	European Union including 27 Member States
FDI	Foreign Direct Investments
FiDiPro	Finland Distinguished Professor Programme
FINHEEC	Finnish Higher Education Evaluation Council
FIRI	Funding Instruments for Research Infrastructure
FP	Framework Programme
FP7	7th Framework Programme
FTE	Full-time equivalent
GBAORD	Government Budget Appropriations or Outlays on R&D
GDP	Gross Domestic Product
GERD	Gross Domestic Expenditure on R&D
GOVERD	Government Intramural Expenditure on R&D
GUF	General University Funds
HEI	Higher education institutions
HERD	Higher Education Expenditure on R&D
HES	Higher education sector
KOKO	Regional Cohesion and Competitiveness Programme
INKA	Innovative Cities Programme
ICT	Information and Communication Technology
IP	Intellectual Property
JPI	Joint Programming Initiative
JTI	Joint Technology Initiative
JTP	Joint Technology Platform
MEE	Ministry of Employment and the Economy
MEC	Ministry of Education and Culture
MoF	Ministry of Finance
NCoEs	Nordic Centres of Excellence
NRP	National Reform Programme
OSKE	Centre of Expertise Programme

OECD	Organisation for Economic Co-operation and Development
PCT	Patent Cooperation Treaty
PISA	Programme for International Student Assessment
PPS	Purchasing Power Standard
PRO	Public Research Organisations
RELEX	Retail Logistics Excellence
R&D	Research and development
R&I	Research and Innovation
RI	Research Infrastructures
RIC	Research and Innovation Council
RIS3	Research and Innovation Strategies on Smart Specialisation
RTDI	Research Technological Development and Innovation
SF	Structural Funds
SHOK	Strategic Centre for Science, Technology and Innovation
Sitra	Finnish Innovation Fund
SME	Small and Medium Sized Enterprise
S&T	Science and technology
Tekes	Finnish Funding Agency for Technology and Innovation
TTO	Technology Transfer Offices
VC	Venture Capital
VTT	Technical Research Centre of Finland
YIE	Young, Innovative Enterprises –programme

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